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As the Editor Views the News

WHAT a change has occurred in the past month in the relations between government and business! As recently as Sept. 30, the date of his last fireside talk, the President in his attitude toward bankers still carried a chip on his shoulder. Also there was doubt as to how much he had modified his earlier feeling of antagonism toward industry. Yet today—only four weeks from the Sept. 30 radio address—the President and his assistants on one side and bankers and industrialists on the other are virtually outdoing each other in their apparent efforts to compose their differences. The change is abrupt and significant.

• • •

It should not be difficult to understand why the President changed his attitude. The 75 per cent reform and 25 per cent recovery medicine which he had been administering in response to the urge of his radical advisers was doing the patient more harm than good. With this hard fact in the background, he could no longer ignore or ridicule the "Tories" who had been asking that the dose be changed to 75 per cent or more recovery and 25 per cent or less reform. The Chief Executive simply recognized the fact that the administration was in a hole (p. 16).

Why F. D. R. Changed Mind

• • •

One finds it more difficult to understand the sudden change of heart manifested by certain financial and industrial leaders. Why did the American Bankers' association soft pedal criticism of the administration? Why did Clarence M. Woolley of American Radiator shower fulsome praise upon the new deal in his statement on Wednesday? Why did Alfred Reeves of the Automobile Manufacturers' association choose the same day to say that "NRA has brought social, economic and psychological advances"? The most plausible answer is that these gestures represent industry's method of standing by the President against the rising tide of radicalism in congress. While applauding the spirit of co-operation which this reflects, we feel that industry should watch its step. In our opinion, industrialists should find a way of supporting the President against radicals without endorsing the unsound policies of his program.

Co-operate, But Watch Step!

• • •

The manner in which the national housing program is gaining momentum gives promise that it may soon take up some of the slack in employment and in the consumption of materials in the building field. Loans for renovating homes now exceed $2,000,000 daily, and it is estimated that repairs handled on a cash basis amount to $10,000,000 daily. That part of the housing program involving the construction of new homes will get underway after the first of the year. Industry may find it desirable to participate in this program actively. It has attractive possibilities as a reviving market (p. 18). The chief obstacle to its success is the attitude of union labor in the building trades. Can you imagine industry and FHA jointly attacking this problem? Stranger things have happened!

Housing To The Fore!

• • •

Conventions again assumed importance in the week's news. Fifth International Foundry congress at Philadelphia (pp. 13, 40-42) embracing an extensive program of technical sessions and an exhibition of foundry equipment and supplies, reflected the great current progress in foundry practice which is enabling the casting industry to take the offensive against other materials in certain competitive fields. In Chicago, steel constructors, attending the twelfth annual convention of the American Institute of Steel Construction (p. 10), divided attention between code matters and problems of technical research and market development. . . . White Castle, operating a nation-wide chain of "hamburger" eating houses (p. 28), has standardized on sheet steel construction. . . .Beryllium copper (p. 30) withstands two billion reversals without failure.

A. I. S. C. and A. F. A. Meet

E. L. Shaner

Fabricators Hear Code Snags; Urge Crossing Elimination

MORE than a hundred members and guests of the American Institute of Steel Construction, attending its twelfth annual convention at the Edgewater Beach hotel, Chicago, Oct. 25 and 26, on Friday listened to an amazing account of ignorance, inefficiency, confusion and trickery on the part of representatives of the government which marked the 16 months of negotiation between the institute's code committee and NRA in the as-yet futile effort to gain approval of a code for the steel construction industry.

The speaker, Clyde G. Conley, chairman of the code committee and president of the institute, prefaced his chronological account of the negotiations with these words:

"Industry has been the innocent victim of much of the unnecessary hodge-podge and chaos that exists in Washington today. And through it all, industry has been patient. You have been patient."

Hit By Personnel Changes

Mr. Conley then explained how the institute's committee visited General Johnson in June, 1933, in regard to its code and was advised by him to hold off until the code of the hot steel industry had been filed and heard. Subsequently the institute filed its code on Sept. 5, and on Oct 30 a hearing was held.

Immediately after the hearing there was a delay while NRA decided which of several deputy administrators should handle the code. This having been settled, the institute on Nov. 17 filed with the deputy administrator replies to all objections voiced at the public hearing.

"We were led to understand," said Mr. Conley, "that we had effectively met all objections and the deputy agreed to write his report and send the code to General Johnson for signature."

However, overnight a change in NRA personnel was made. Many NRA officials who had followed the negotiations to this point resigned and a new official stepped in.

In the meantime, an acrimonious debate arose between the code committee and representatives of the administrator over whether or not the committee should sit with the labor advisory board to review the provisions of the code. Also, NRA constantly was undergoing "its many changes in personnel and its various upheavals in policy." The code was referred from one deputy to another.

During the winter the advisory council of A. F. of L. voted to support the president of the Bridgemen's union in opposing the inclusion of erection of fabricated steel in the institute's code. Because the institute refused to sanction the withdrawal of the erection provisions from its code, the negotiations continued in deadlock before General Johnson. In March, at the request of the administrator, the committee conferred with a local erectors association and committees of the Associated General Contractors and of the construction code authority.

"All of these conferences were laborious," declared Mr. Conley. "We wrote amendments to the code one day only to have them thrown out the next. We rearranged paragraphs, rewrote clauses, only to have them put back in their original shape first by this board and then by that committee, until we really did not know where the whole matter stood. The legal advisory board of NRA, which had prior to Dec. 14, 1933, given its complete endorsement of our code as written, suddenly withdrew its approval and put in a demand for a long list of changes in verbiage. This, in effect, was the result of General Johnson's announced policy to have checks and balances in the code negotiations. It achieved nothing and got us nowhere."

Later in June NRA intimated the code was in final shape to be sent to General Johnson for signature.

"On July 11, as we understood," said Mr. Conley, "just before General Johnson boarded his plane for the west, he signed an executive order approving the code upon condition 18 changes be made. None of the changes . . . had been discussed with us and the order itself took your committee by surprise."

On July 18 the board of the institute rejected the changes by a large majority, recounted Mr. Conley, who continued:

HE X-RAYS NRA: Clyde G. Conley, head of the American Institute of Steel Construction and chairman of its code committee, snapped at last week's convention in Chicago as he "told all" concerning negotiations for the structural fabricating code

Labor Has Inside Track

"At this point, I would like to call your attention to a few things that we later found out had happened. On July 11, when General Johnson is supposed to have signed this executive order, copies of the executive order were not available to us, and yet the *New York Times* carried an interview the next morning with labor leaders who outlined very clearly what action the General had taken. . . . The labor advisers must have had a good deal to do with the emasculation of our code. As a matter of fact, P. J. Morrin, in his magazine, later claimed that distinction."

Mr. Conley then enumerated in detail other phases of the unfair treatment accorded the structural steel industry at the hands of NRA. In conclusion he said:

"While I recognize that our industry has been kicked about and mishandled, it was due to the ignorance and lack of policy on the part of those charged with the negotiations for the government. We know and the government knows that cut-throat competition is the most destructive influence in the country today. We know and the government knows that some practical method must be devised to punish those who persist in cut-throat practices. I, for one, believe that ultimately a solution can be found, and it is incumbent upon us to rise above the 'slings and arrows' of office-holders that some

permanent good may be achieved for American businesses."

Following Mr. Conley's report most of members of code committee commented briefly upon various phases of negotiations. The committee in addition to Chairman Conley consists of W. W. Wood, Mississippi Valley Structural Steel Co., Decatur, Ill.; R. P. Hutchinson, Bethlehem Fabricators Inc., Bethlehem, Pa.; C. Edwin Michael, Virginia Bridge & Iron Co., Roanoke, Va.; J. L. Kimbrough, Indiana Bridge Co., Muncie, Ind.; L. A. Paddock, American Bridge Co., Pittsburgh; and G. H. Blakely, McClintic-Marshall Corp., Bethlehem, Pa.

Discussion turned toward the problem of maintenance of standards of fair trade practice, either under the institute's own code of fair practices or under the NRA code, if it is finally approved.

Desirability of devising a formula for costs was considered at length.

Consider Quantity Extras

H. B. Hirsh, Belmont Iron Works, Philadelphia, and chairman of the committee to confer with the American Steel Warehouse association, reported upon the proposal of the steel industry to impose quantity extras on structural shapes and plates ordered in small lots. He urged further consideration of the new extras, which were originally announced by the steel code authority to become effective Sept. 1 but which effective date has been postponed until Dec. 1.

E. L. Ryerson and E. D. Graff of Joseph T. Ryerson & Sons Inc., Chicago, discussed the quantity extras from the standpoint of the steel warehouse interests.

Eight directors of the institute were re-elected for three years, as follows: R. I. Ingalls, Ingalls Iron Works Co., Birmingham, Ala.; R. C. Mahon, R. C. Mahon Co., Detroit; Mr. Wood; Jose A. Moore, Moore Drydock Co., San Francisco; Mr. Conley; Art J. Dyer, Nashville Bridge Co., Nashville, Tenn.; Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa.; and Edward K. Klingelhofer, Pittsburgh Bridge & Iron Works, Rochester, Pa.

The convention sent a letter to President Roosevelt urging him to set aside $1,400,000,000 for grade crossing elimination, stating it would help the durable goods industries and provide 9,000,000 men a month's work, equivalent to a year's work for 750,000 men.

Following a conference held Thursday evening at which representatives of the fabricating industry meeting independently of A. I. S. C. discussed marketing of plain material and regulations governing purchase from the mills, a committee appointed by that conference offered the following report to the convention:

"We recommend that the officers of A. I. S. C. be authorized to oppose enforcement of regulation No. 9 of the American Iron and Steel institute. We further recommend that the officers negotiate with the code authority of American Iron & Steel institute concerning any regulations now in effect or hereafter proposed by that body which may in any way affect the fabricating industry."

This resolution was adopted.

"The posting of prices by the steel mills has effected a stabilization that is wholesome not alone to the mills but to the fabricating industry as well," declared Mr. Conley in his opening address as president.

"We have a tremendous stake in the reforms the mills are endeavoring to effect in the marketing of plain material. We can assist them materially in achieving that end. Some of the plans they proposed have not met the entire approval of this industry. We believe that the mills have not had a full opportunity to inquire into our peculiar problems and special methods. We hope a beginning will be made now to correct that situation.

Institute Members Were Active

"The problems of the steel fabricator are problems of national importance. Today we have an opportunity to extend the good offices of the institute and to work for much richer opportunities. For the first time since the creation of the institute we find the mills offering us the first practical means of doing just that. It is our duty to take advantage of it."

Mr. Conley reviewed briefly some of the year's developments, saying that the institute's membership has fabricated and shipped a larger tonnage of structural steel than in the preceding year; it has embraced in its membership a much larger percentage of the industry by tonnage than ever before, and its gross income was larger than during the preceding year. Speaking of the institute's contacts with the government, he said:

"Our negotiations with the national recovery administration have been especially arduous and complex. Each member of the code committee has contributed much more time to the negotiations than his private affairs warranted, but felt that a duty assumed is one that must be honestly discharged."

The value of the new buildings erected in American cities in 1932 was only one-tenth of the value of new construction in the same cities in 1925, V. G. Iden, acting secretary, told the institute.

Code Delay Was Costly

"Under the national industrial recovery act industry was promised an opportunity to stabilize and to rebuild on a profitable basis," he said. "In all good faith we went to Washington last summer on behalf of the structural steel and iron fabricating industry and offered a code of fair competition designed to put a stop to some of these losses, but our committee remained the year to argue with the administrator why that particular code was necessary."

While the debate with Washington continued, he pointed out, the value of urban buildings erected in 1933 declined to a sum equal to one-twelfth of the value of buildings erected in the same cities in 1925, a decline in values which no other single industry in the United States suffered.

According to the institute's annual report the prospective markets offering the most immediate opportunities for exploitation are, in the order of their importance: Steel floors for

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GERMAN STEEL CHIEFS ARRIVE IN NEW YORK: Albrecht Von Frankenberg und Ludwigsdorf and Hermann Baumguertel, members of the board of the United Steel Works, of Dusseldorf, arriving in New York recently.
Wide World Photo

◆

bridges and buildings in new construction, steel floors for reconstructed bridges, steel dams, structural sheet and thin plate steel, steel piling and abutments.

Of the 240,000 grade crossings in this country probably not more than 30,000 are protected, it states, commending plans for a public campaign for the elimination of such crossings, and the government for its apparent efforts to make this an important part of railroad rehabilitation.

"Bridge building and public works have constituted the chief activities of our industry during the past year," the report says. "The public works administration has directly and indirectly provided a market for probably better than two million tons of fabricated structural steel. Not all of that was booked during the past year. Some of it is yet to be contracted for. It is most significant, however, that there has been little if any building for private account for nearly three years.

Private Building Gaining

"It should be remembered that during normal years the federal, state and municipal governments spent approximately three billion dollars for construction. Even with the aid of the public works administration and the backing of federal credit this volume is today less than two billions a year.

"Private construction is now about to come into the market again. There has been a gratifying increase in inquiries of this nature. If not checked by unforeseen circumstances, it should develop rapidly. There is undoubtedly a tremendous pent-up demand. We have witnessed no private building of consequence during the past three years. Some new skyscrapers are being planned. Unoccupied space in urban centers is being leased. A slow absorption of present structures is reported.

F. H. Frankland, director of engineering service, reported on the technical activities of the institute. He stressed particularly the importance of suitable data on fireproofing in conection with the institute's work on building codes.

Prof. George E. Large, Ohio State university, Columbus, O., described tests with a model of a structural steel building to check the Spurr method of wind stress design. The results reported correspond closely with the values calculated by Mr. Spurr's method.

J. A. Hall, special representative, FHA, Washington, spoke briefly on the objectives of the federal housing campaign. He explained that the emphasis now is being placed upon repair of homes and that the campaign to encourage new construction will start after the first of the year. He urged all interests identified with building to participate in the work and to promote good construction at all times.

The extent to which propaganda put out by producers of materials competing with steel gives erroneous ideas of the properties and performance of steel was discussed by John A. Crook, president, Denver Steel & Iron Works Co., Denver. He referred to improper specifications for reinforcing rods, to misconceptions in regard to the corrosion of steel, and to deception as to the fatigue of steel.

The possibility of stimulating markets for steel-frame houses was discussed by G. G. Greulich, sales engineer, Carnegie Steel Co., Pittsburgh.

"For use as horizontal load carrying members, i.e., the beams or joists in the floors and ceiling construction, you may have to order a bill of material from the mill," he declared. "The vertical members, however, such as studs and minor framing in the walls and partitions, offer a splendid opportunity for you to utilize many odds and ends of good quality angles, small channels, and other sections which may have accumulated in your plant. It is much more desirable to dispose of these light sections in this manner than to carry them as inventory and eventually have them deteriorate into scrap."

"Furnishing such odds and ends in the first few steel frame houses in your community would probably result in the utilization of all of this class of material which you might have on hand."

Warns of Overhead

"Problems of the Smaller Shop" were dealt with by W. B. Truitt, vice president, Carolina Steel & Iron Co., Greensboro, N. C.

He gave his opinion that probably more small business ventures fail for lack of experience and judgment in applying the item of overhead expense than for any other reason.

"If the manager of a small concern thinks he can get away with an overhead expense of less than 100 per cent based on actual shop labor, he deceives himself," he said. "The percentage will likely be nearer 200 and under growing conditions, unless confidence is restored to start private building, the percentage may easily rise to 300."

In discussing the ideal organization of the small shop he listed three officials—a president serving for a nominal remuneration; a vice president, thoroughly experienced and efficient and responsible for results, and a secretary who "might well be a live wire attorney on a nominal retainer." Referring to the latter, he said:

"In the days ahead for American business, this relationship may be well worth while, for amidst the rapid changes, when even long experienced lawyers admit they must almost start anew, it is too much to expect of the technical and practical man to avoid pitfalls. The new taxes will ruin any small concern unless up-to-the-minute legal advice is near at hand."

Honor John Penton

To John A. Penton,
Friend and Counsellor of Foundrymen:

Two score and two years ago you brought to the inarticulate American foundry industry a vision of national unity. As founder, editor and publisher of THE FOUNDRY you emphasized the bond of common interest existing among foundrymen and inspired them to consider the advantages of co-operating for their mutual benefit.

Through printed page and by virtue of your contacts with thousands of acquaintances in every community where castings were poured you contributed more than any other individual to the creation of an inspired industry consciousness.

John A. Penton

Later, when this newly-born spirit culminated in plans for the first national meeting of foundrymen in Philadelphia, you voluntarily, unofficially and at your own expense, stimulated widespread interest in the event, insuring the representative attendance which made possible the founding of the American Foundrymen's association.

During the first year of its existence, as secretary you nursed the organization through its most critical period, serving virtually as executive officer and board of directors.

For this conspicuous service to the industry, for your unwavering interest and support to the American Foundrymen's association from the date of its founding, and for the inspiration you have given to thousands of foundrymen everywhere, the American Foundrymen's association by the unanimous action of its board of directors, desires to record its enduring esteem and appreciation.

Frank J. Lanahan, president,
C. E. Hoyt, secretary.

AFA-International Foundry Congress Interest 3000

A REGISTRATION total approximating 3000 evidences the unprecedented interest and enthusiasm displayed at the fifth international foundry congress and the thirty-eighth annual convention and exposition of the American Foundrymen's association, held Oct. 22-26, in the Philadelphia convention hall, Philadelphia.

Between the formal opening at noon last Monday and the conclusion Friday noon, when a special train took visitors to the Bethlehem Steel Co. for a plant visitation, there was something of interest in every angle of foundry work.

Shop courses were run on sand control and gray iron; there were sessions on apprentice training; the code authority of the foundry equipment industry met; nonferrous, steel, malleable and gray iron founding had their innings; a session was devoted to refractories; the eastern section of the Malleable Founders society met; the A. S. M. E. and A. F. A. jointly discussed patternmaking, to say nothing of a reception to overseas guests, the annual alumni dinner, the annual banquet, a number of round table luncheons and a mystery night program at the exposition. These are briefed on pages 40-42.

A feature was the signal honor paid to John A. Penton, chairman of the Penton Publishing Co., Cleveland, who was editor of *The Foundry* when the A. F. A. was organized and largely made that organization possible.

An engrossed resolution of the board of directors was presented to Mr. Penton by S. Wells Utley, Detroit, past president of the association, at a dinner Monday night attended by past and present officers and charter members.

At the formal opening Monday, J. Hampton Moore, mayor of Philadelphia, extended greetings. F. J. Lanahan, who was retiring as president, to be succeeded by Dan M. Avey, present editor of *The Foundry* (see p. 21) introduced foreign delegates, for whom J. Leonard responded for Belgium, A. Brizon for France, Prof. Eugen Piwowarsky for Germany, James Smith for England, Dr. Ing. Luigi Norsa for Italy, W. Watha Kosiski for Poland and Prof. Don Jose Navarro Alcacer for Spain. Vincent Delport, manager of the Penton Publishing Co. Ltd., London, translated the responses. Greetings from the British and French foundry associations were read by Mr. Avey.

Whiting Medal to Lenz

At the annual banquet held Wednesday evening, Gen. T. S. Hammond, of the Whiting Corp., Harvey, Ill., and chairman of the A. F. A. board of awards, presented the J. H. Whiting gold medal to Arnold Lenz, assistant manufacturing manager, Chevrolet Motor Co., Flint, Mich., for his contributions to the progress of the foundry industry.

Mr. Lenz, whose career was described in STEEL for Oct. 15, p. 23, related the operation of the General Motors labor policy, in speaking before the annual business meeting of the A. F. A.

After accepting the code for the automotive industry, General Motors assisted and encouraged employes in the formation of an association for the purpose of collective bargaining, the basis being one representative to every 300 to 450 employes.

Foremen Represent Management

Citing foremen as the key to harmonious relations between management and employes, Mr. Lenz described how foremen were found organizing their departments for outside unions and acting, in effect, as a complete insulation between upper management and workers.

Advising foremen that their posts were the first step in management, they were given the alternative of turning in their union cards or resigning as foremen and stepping back into the ranks. This stand was sustained by the automobile labor board.

A. W. Robertson, chairman of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and principal speaker at the annual banquet of the A. F. A., said that "unless we have some regulation which prevents cut throat competition, we are going to devour each other in short order. Such being the case, some kind of an ordered or planned economy seems advisable, but the wrong kind of a plan or more plans than can be administered would probably be worse than no plan.

"Whatever kind of planned econ-

New Officers of A. F. A.

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View in the larger division of the exposition conducted by the American Foundrymen's association in Philadelphia, Oct. 22-26. This division housed the heavier equipment, much of which was in operation

omy we have, it must be built upon a sound foundation of honest economy, using 'economy' with the old fashioned meaning. I believe we may fairly assume that some kind of sensible adjustment of our many problems, which can only be done by wise order and planning carried out with good faith and good will, will be developed in the near future. As some one has wisely said: 'Nothing Can Keep Back The Dawn'."

Financial

BETHLEHEM STEEL CORP. reports deficit of $2,400,126 for the third quarter, compared with a profit of $3,441,642 in the second quarter, and a deficit of $283,097 in the third quarter of 1933. In the third quarter this year, as last year, an operating profit was shown, but provisions for depletion and depreciation wiped them out.

For nine months of this year, Bethlehem's net is $139,473, or 15 cents a preferred share, whereas the net deficit for the first three quarters of 1933 was $9,365,395. Directors have omitted the $1.75 quarterly dividend on the preferred stock which was paid one quarter ago.

E. G. Grace, president, said he looks for little change during the fourth quarter. Railroad buying for the year is about finished; aside from the navy, little is in sight in shipbuilding. There has been no improvement in automotive buying, but there may be a little more miscellaneous demand. Current operations are 26 per cent, compared with an average of 22.8 in the third quarter, and 51.8 in the second quarter. Orders on hand Sept. 30 totaled $58,476,986, compared with $70,436,890 on June 30.

A. H. S. Post, president, Mercantile Trust Co., Baltimore, succeeds the late W. E. Corey as a director of Bethlehem.

J. & L. LOSS IS $1,826,227

Jones & Laughlin Steel Corp., Pittsburgh, reports total loss of $1,826,227 in the third quarter, against net income of $886,252 in the second quarter and loss of $1,924,524 in the first quarter of 1934.

Nine months' net loss this year is $2,864,499, compared with total charge to surplus of $5,180,933 in the nine months of 1933.

A loss of $525,056 was incurred through operations in the third quarter of 1934. Reserves for depreciation and depletion amounted to $1,220,142 and bond interest, $81,029.

Gulf States Steel Co., Gadsden, Ala., reports loss of $205,374 in the quarter ended Sept. 30, after interest, depreciation, taxes, etc., compared with profit of $201,616 in the preceding quarter, and profit of $166,670 in the September quarter last year. For nine months, the company reports loss of $13,571, against profit of $54,543 in the same period of last year.

REPUBLIC MERGER MEETING IS POSTPONED TO DEC. 17.

Meeting of stockholders of the Republic Steel Corp., called for Oct. 30 at Jersey City, N. J., to consider the proposed consolidation of the Corrigan, McKinney Steel Co., Cleveland, with Republic, was postponed last week to Dec. 17.

In a letter to stockholders, T. M. Girdler, chairman, pointed out that the registration statement required to be filed at Washington is so detailed it has not yet been completed.

The merger plan has been well received by stockholders as a whole, according to Mr. Girdler, and "the number of proxies and deposits thus far received has been gratifying."

Stockholders of the Cleveland-Cliffs Iron Co., Cleveland, meeting last Tuesday, voted approval of the sale of Corrigan-McKinney to Republic. Cleveland-Cliffs owns 110,042 common shares of Republic and 109,375 common shares of Corrigan-McKinney, which will be voted favorably.

Stockholders of the McKinney Steel Holding Co., which holds about 55 per cent of the voting shares of Corrigan-McKinney, Thursday authorized their officers to vote for the merger.

Cliffs Corp., Cleveland, owning 144,000 common shares of Republic, also has favored the merger.

PAYS 70% CASH ON BONDS

Williamsport Wire Rope Co., Williamsport, Pa., bondholders' protective committee for the first mortgage sinking fund 6 per cent gold bonds of the company last week announced a modification of the reorganization plan so as to provide an immediate distribution of $700 in cash for each $1000 principal amount of bonds.

Modification has been made possible by an amended offer of Bethlehem Steel Co. to provide funds for the distribution against delivery to the Bethlehem Company of the deposited Williamsport bonds.

Depletion-Depreciation Charges Put Bethlehem in Red

	Third Quarter 1934	Second Quarter 1934	Third Quarter 1933
Total income of the corporation and its subsidiary companies	$2,662,202	$8,738,463	$4,879,146
Less—Interest charges	1,671,845	1,714,938	1,688,534
Balance	$ 990,357	$7,023,525	$3,190,612
Less—Provision for depletion and depreciation	3,390,483	3,581,883	3,473,709
Net income for the period	*$2,400,126	$3,441,642	*$ 283,097

*Deficit.

Foreign

JAPAN IRON MFG. CO. has requested permission to import 100,000 metric tons of steel products, according to Assistant Trade Commissioner Donald Smith, Tokyo. It will include 20,000 tons of round steel bars, 7000 tons of flat square bars, 10,000 to 15,000 tons of medium-size angles, 8000 tons of heavy plates, 30,000 tons of black sheets, 10,000 tons of wire rods and 10,000 tons of unnamed steel products. These imports are asked for because of shortage caused by suspension of steel mill operations in Kobe and Osaka districts, resulting from the September typhoon, and to prevent further rise in domestic Japanese steel prices.

Basing Point

FIELD work has been completed by experts of the federal trade commission who have been working on the Birmingham iron and steel differential case.

It is understood that the result of this preliminary survey has been turned over to other experts of the commission who are working on the results of the working of the steel code, on which a report must be made to the President on or before Dec. 1.

The Birmingham differential case and the general steel code and working of the basing point probably will be taken up in one report. It is not known at this time if the report, which is to be made to the President, will be made public.

Transportation

SEVEN large steel producers in the Pittsburgh district joined last week in significant displays in an exhibition barge which left Pittsburgh, Oct. 25, showing the greatness of that city as an industrial center.

The diesel-engined towboat, PEACE, cast off from Pittsburgh docks last Thursday with a nine-barge tow, celebrating the Union Barge Line's 150th voyage between Pittsburgh and Memphis. The trip will be broken up by frequent stops at principal river cities and then will continue to New

Orleans. The 1952-mile voyage from Pittsburgh to the Gulf of Mexico will find this modern argosy arriving at New Orleans, Nov. 18.

Jones & Laughlin Steel Corp., Carnegie Steel Co., Spang, Chalfant & Co. Inc., and American Steel & Wire Co., as well as Wheeling Steel Corp., Koppers Products Co., and Dravo Contracting Co., all have their products represented on the one exhibition barge.

Labor

AN ARRAY of important steel presidents, including Eugene G. Grace of Bethlehem, Charles M. Hook of American Rolling Mill, and William W. Holloway of Wheeling Steel, took the stand at Wilmington, Del., Oct. 23, in behalf of the Weirton Steel Co. in the action brought against it by the department of justice.

Each president supported the contention of E. T. Weir, chairman of the National Steel Corp., of which Weirton is a subsidiary, that the organization of employes in inside unions (the term "company unions" was branded a misnomer) affords ample opportunity for collective bargaining under the recovery act.

According to Mr. Grace, Bethlehem has experienced practically no labor difficulties since its employes set up a similar plan. Mr. Hook testified that American Rolling Mill plants "never lost an hour's work or a ton of production" through difficulties between employes and management.

Walter C. Teagle, president of Standard Oil of New Jersey, also testified in behalf of Weirton.

HEARINGS ARE CONTINUED

Continuation of hearings, involving the Youngstown Sheet & Tube Co. and Acme Steel Co., Chicago, and their workers was ordered by the national steel labor relations board Wednesday. The Youngstown case was adjourned until Nov. 12 and 13, and the Acme case to Nov. 14, when the board will go to Chicago for hearings.

The labor board has also announced hearings at Pittsburgh, Nov. 8 and 9, involving the Jones & Laughlin Steel Corp., and at Washington, Oct. 29, involving the Northern Steel Co., Somerville, Mass.

STEEL EMPLOYMENT FALLS

American Iron and Steel institute reports a drop of 6 per cent in employment in the iron and steel industry in September, compared with August, and nearly 10 per cent compared with a year ago. Total number of all employes in the steel industry was 381,828, of which 343,064 were on an hourly, piece-work or tonnage basis. The low point for the year to date was in the week ended Sept. 8, the total being 321,463. By the end of the month, the total had been increased over 20,000. The high point for the year was in the week ended June 16. Total payroll in September was $29,142,892, against $34,362,208 in August, and $37,322,250 in September, 1933. Average hours worked per week by each employe was 24.2, against 26.5. Average earnings per hour were increased to 73.8 cents from 72.2 in August, and 63.6 in September, 1933.

Production and institute news will be found this week on Page 70.

New Capacity

YOUNGSTOWN SHEET & TUBE CO., Youngstown O., through Frank Purnell, president, announced Friday that it has awarded to the Mesta Machine Co., Pittsburgh, the contract for a cold-rolling mill with an annual capacity of 200,000 to 250,000 tons a year, at its Campbell, O., works.

This mill will absorb part of the production of the new continuous strip mill now being erected at Campbell, which will have an annual capacity of 500,000 to 600,000 tons of hot strip.

A separate building covering 216,000 square feet, to be erected by the Fort Pitt Bridge Works, Pittsburgh, will house the cold-rolling mill equipment. The latter will include one 3-stand tandem 4-high finishing unit, and two single-stand 4-high mills, along with continuous annealing, pickling, shearing, and straightening machinery.

The cold mills will be capable of rolling down the unfinished hot strip to 26 gage in thickness and 84 inches in width.

The cold-rolling mill is expected to be ready for operation by April 1. The continuous mill will probably be completed by Feb. 1.

It is expected that an award of furnaces as part of the equipment for the new mills will be announced in a few days.

Foreign Trade

IMPORTS of iron and steel into the United States in September totaled 23,847 tons, compared with 32,418 tons in August, and 55,706 tons in September, 1933, according to the iron and steel division of the department of commerce, Washington. In the first nine months, imports amounted to 241,579 tons, against 307,610 tons in the same period of 1933.

EVER since Oct. 18, the five-man board of election (pictured above) of the Amalgamated Association of Iron, Steel and Tin Workers had been counting, checking and rechecking ballots at Pittsburgh which were cast for the union's officers in the election, Sept. 15.

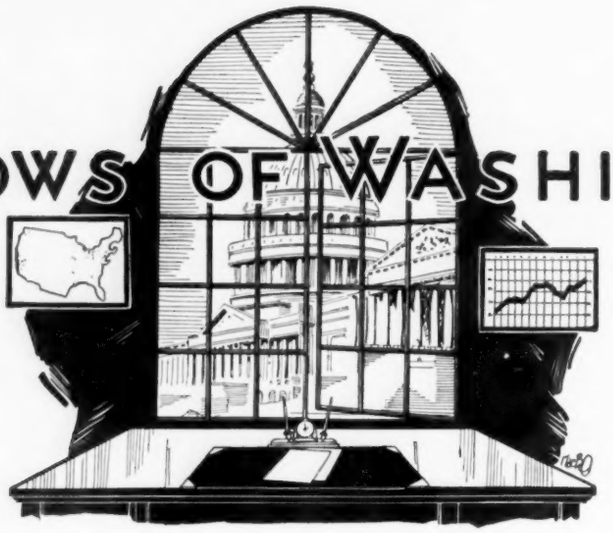
It was only by late Wednesday afternoon, Oct. 24, that the election board was in shape to announce its findings. By a close margin, the incumbents in the Amalgamated were returned to office for the coming term, which will be for two years beginning Jan. 1, 1935.

This means that Michael F. Tighe, for 15 years president and for 57 years a member of the Amalgamated, won out over George J. Williams, the "rank-and-file" candidate. Thomas J. Gillis and Edward W. Miller, incumbent vice presidents, likewise were returned to office. Louis Leonard was re-elected secretary and treasurer, but was unopposed.

Some 6500 votes from but half of the union's 242 lodges scattered through 12 states thus returned the conservative group in the steel industry's outstanding American Federation of Labor affiliate over the "rank-and-filers." The latter blamed their defeat on both the early withdrawal of two of their aces, Earl J. Forbeck and William J. Long, as well as the poor voting return from the union's 11 districts.

In the above photo by Acme, the canvassing board from left to right consists of James Hoffa, Pittsburgh; James Shalcross, Chicago; John Powell, Troy, N. Y.; John Sandor, Canonsburg, Pa., and T. I. Lewis, Detroit.

WINDOWS OF WASHINGTON



WASHINGTON

IN THEIR better moments not even the most radical anti new dealers would want the President to shout from the house tops—the White House top, if you please—that his policies have been ill conceived, that his advisers have misled him, and that he is casting himself upon the business community for forgiveness.

That would vitiate much of the President's influence, to say nothing of being unbecoming, and after all, those who feel that business has been badly used thus far in his administration are less interested in a public retraction than in diverting that influence and talent for leadership into channels more beneficial to business. What matters is the substance, not the word.

Certainly, short of an advertised pilgrimage to Canossa, the President has been doing a most remarkable about-face. He may take it all back tomorrow—the future is anyone's—but over the past month the record speaks eloquently. Only because business is politically-minded, and this attitude has been forced upon it, has the record seemed unconvincing.

BUSINESS MEN TO FORE

Whatever the implication, the Tugwells, Perkinses, Moleys, Hopkinses, Howes and other lurid shades of political thought have been fading out. The report is around Washington that the President is definitely convinced that the remedies this group has been advancing are not even palliatives, let alone specifics, but that, of course, is only report.

Full of assurances to business and with an occasional apology to industry—as, for example, to steel—Donald Richberg has become the White House spokesman. Many leaders of industry have been crossing the White House threshold, including Myron Taylor for steel. Two steel executives—W. L. Allen and Edward R. Stettinius Jr.—have returned to NRA.

At Williamsburg last week, the President got on record with the country as opposing a cash bonus to World war veterans, and even if it did not register with the American legion convention in Miami it enhanced the President's stature before the rest of the country. Before the bankers whom he taunted with nonco-operation in his fireside radio talk Sept. 30, the President last week became an apostle of trust and friendship.

DOLLAR PROBLEM VEXING

As far as he could go, the President has pledged stabilization of the dollar at its present level for the time being. The other *sine qua non* of business—balancing the budget—is indeed a thorn in the flesh, and may explain much of the recent rapprochement with business.

Apparently, as late as last spring the President expected to balance the budget in 1935, but now it cannot be promised with reasonable certainty for probably another year, for two reasons: The increasing number of persons on relief who cannot be left to starve, and, the inability of business to bear greater taxation.

Obviously, had NRA, AAA or other brain trust panaceas been effective re-employment would have mounted sufficiently to permit radical reduction in relief and recovery expenditures. Lisewise, such re-employment would have presumed a more prosperous industry. Thus, as government expenditures declined, its revenues would have increased, and a balance been struck. The President may be more worried over this than is generally known.

There have been some repercussions from abroad, too. Returning observers bring this viewpoint: World recovery has proceeded as far as it can without stabilization of the dollar, pound and franc—such as Ambassador Bingham to the Court of St. James proposed last week. Fears are entertained abroad that the dollar will slide off due to the unbalanced budget.

Such a slide would be injurious to domestic as well as foreign business, and the obvious remedy would be inflation. It may be, too, that those business men who demand that the budget be balanced scarcely realize it can be effected at this time only by a dangerous increase in taxation. It may be taken for granted that relief expenditures will remain high so long as unemployment is not relieved.

To what extent the President's hand has been extended to business because of indications of lessening popularity of the new deal is difficult to determine. Polls may be disparaging of the new deal, but that is something apart from the President's personal popularity. All along he has said he was experimenting; he has always left the door open behind him.

GROUNDWORK BEING LAID

It is indeed a strange spectacle in Washington these days: A President anxious to assure business that his administration is not hostile to such fundamentals of American economy as private initiative and the profit motive; a business community longing for just such assurance but with the reserve of a burnt child.

JUST what does all this mean for iron and steel? At the moment it develops no tonnage, but since when did Washington fill order books? It gives promise, however, of laying the groundwork for a more certain recovery.

As a matter of fact, Washington has been extremely frank with the industry recently. It has attempted to dissolve some of the hopes predicated upon resuscitation of the durable goods industries.

For the heavier forms of steel,

such as that entering into skyscraper construction, it sees no reasonable, immediate hope. It is the lighter forms of durable goods, or what might be called consumers' capital goods, such as refrigerators, that hold the promise.

That is one reason for so much publicity recently from Washington on housing, which this department has emphasized. It will be spring before the verdict is in, but as the administration sees it, not skyscrapers or rails or rolling stock but what might be termed "steel in the home" is the market to push.

Incidentally, in addition to the many steel producers and fabricators beginning to notice this market, a Milwaukee interest which has pioneered many advances in the manufacture of automobile frames, pipe and other mass production products is about to offer something new and important shortly in the way of a house frame not only welded in sections in the shop, but these sections also to be welded together in the field.

HOUSING INCREASES BUSINESS

Third quarter reports of such companies as American Radiator, Johns Manville and Philip Carey will reflect to some extent greatly increased business in September due to housing and renovation programs, but in the fourth quarter the gains may be accentuated.

PWA's housing section is moving ahead rapidly on the basis of examinations into housing needs of more than 75 cities. Thirty-nine federal low-cost housing projects have been awarded $138,500,000, with $11,500,000 placed with seven limited dividend corporation housing projects. Into the latter classification would fall company housing as it is known in the steel industry.

The President made a further gesture toward steel last week when he stated that loans for rails and equipment would be made at 3½ instead of 4½ per cent. None is in prospect now, however, as many of the rails rolled last year with federal funds have not yet been laid.

An opportunity for steel to slough off the limitation on construction of new iron and steel making capacity also is offered through a new NRA policy. Under the steel code, finishing mill capacity can be increased, but no blast furnaces, bessemer converters or open-hearth furnaces built. Lifting this inhibition now becomes a matter of negotiation with the new industrial advisory board of NRA.

Still another gesture toward industry, in which steel could participate, is the new policy against the prohibition of sales below cost. This too is an individual matter for each industry to take up with NRA, but these inhibitions, along with the restriction on machine-hours, are being discarded as a matter of NRA policy.

R H. DeMOTT, sales manager (left) and Robert C. Byler, advertising manager (right) of SKF Industries Inc., Philadelphia, supply the background for gaging the size of this 1500-pound self-aligning roller bearing manufactured by SKF

Emissaries for the administration have informed steel producers that organized labor has overplayed its hand, and the industry need not be alarmed on this score. It was reassuring that Michael F. Tighe, conservative, was re-elected head of the Amalgamated association.

THAT decision of the supreme court of the District of Columbia knocking out the railroad pension law rushed through congress just as it adjourned last June and signed by the President with the reservation that it was faulty, is heartening to steel and other industries.

The district court held the act unconstitutional for two basic reasons: Congress exceeded its authority in intrastate matters, as about one-fifth of the 200,000 employes of the railroads are engaged solely in intrastate labor, and, it is confiscatory in depriving the carriers of property without due process of law.

It is easy to reason that of the 300,000-odd employes in steel, a good proportion are engaged in the manufacture of steel for intrastate commerce. Much of the steel produced in Pennsylvania is fabricated in that state, and as much can be said for Ohio, Indiana, Illinois and other major states. The second ground also would apply with equal force to steel.

As buyers of transportation, steel and other industries will benefit from the decision because it removes one of the three props under the railroads' case for higher rates.

RATE INCREASE DUBIOUS

Asking in the case of iron and steel a rise of 10 per cent or a maximum of 2 cents per 100 pounds, the carriers have cited these additional costs: $60,000,000 due to pensions, $130,000,000 additional cost of supplies on account of NRA, and $160,000,000 representing the cost of restoring wage reductions.

The $60,000,000 item for pensions (the carriers now pay out $30,000,000 annually for their own plans) is automatically knocked out because, while the United States Supreme Court will not pass on the issue for some months, the assumption will be that it will sustain the lower court.

Friends of railroad labor in congress will attempt to circumvent the decision, no doubt, but until the issue is finally decided by the highest court their efforts will be stymied.

Incidentally, little interest is manifested in this rate case, which will be resumed Nov. 26 with hearings in the West. The opposition is more from the agrarian than the industrial states. The feeling in Washington is that the new deal having increased costs on top of a deficit that for Class I roads reached $31,000,000 in the first seven months of this year, the interstate commerce commission will do something, but not much.

Benedict Heads Refrigerating Body

REFRIGERATING Machinery association at its twenty-first annual convention in Chicago, Oct. 22-23, elected D. Norris Benedict, vice president and general manager of Frick Co. Inc., Waynesboro, Pa., president to succeed W. S. Shipley, president of the association during 1933 and 1934, who also is president, York Ice Machinery Corp., York, Pa.

It also chose J. M. Fernald, general manager, Baker Ice Machine Co., Omaha, Nebr., vice president, and placed on the executive committee in addition to Messrs. Benedict, Fernald and Shipley, A. H. Baer, vice president, Carbondale Machine Corp., Harrison, N. J.; G. A. Heuser, secretary-treasurer, Henry Vogt Machine Co., Louisville, Ky.; J. I. Lyle, president, Carrier Corp., Newark, N. J.; Emil Vilter, president, Vilter Mfg. Co., Milwaukee.

Opening the convention, Mr. Shipley predicted that "prosperity will return just as soon as confidence returns to investors of capital. These investors must have some assurance from the federal government of a balanced budget and a stable monetary policy."

John W. O'Leary, head of the Machinery and Allied Products institute, said that not only must the drift toward government control of business enterprise be stopped, but also some of the former position must be regained.

The Spring meeting will be held at Hot Springs, Va., May 23-25.

Died:

FRANK H. Nullmeyer, 60, for over 25 years superintendent of the rod and wire plant of the Youngstown Sheet & Tube Co. at Struthers, O., at his home in Youngstown, O., Oct. 20.

A self-educated man who became a recognized authority in the steel wire industry, Mr. Nullmeyer became intensely interested in mechanics as a young man. While working for the Jones & Laughlin Steel Corp. he studied mechanical drawing at night school. Leaving the mill, he served for three years as a machinist apprentice in a foundry, becoming a full-fledged machinist. Through correspondence schools, he studied mechanical engineering and chemistry, completing the engineering course.

His first engineering job was as a draftsman with the Shoenberger Steel Co., Pittsburgh, in 1889, and when this concern was absorbed by the United States Steel Corp. a year later, he was chief draftsman. Later he became assistant chief engineer of the Pittsburgh district, and March 1, 1903, became assistant superintendent of the Rankin Mill of the American Steel & Wire Co. In the same position, he went later to the Donora plant, advancing to superintendent at Rankin, and later at Braddock, from which plant he went to Sheet & Tube, March 22, 1909, and had been in the same post ever since.

Since that time Mr. Nullmeyer virtually built the present plant, which later included a conduit department. He was one of the best known authorities on steel wire. His most recent and most important invention, the Nullmeyer wire-drawing block, has recently been installed in the Sheet & Tube plant, and is widely accepted by other wiremakers.

Between March 12 and April 2, 1934, STEEL printed a series of articles by Mr. Nullmeyer on wiremaking.

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David B. Oliver, a pioneer of the Pittsburgh district steel industry, at Pittsburgh, Oct. 21. He would have been 100 years old Oct. 31.

Mr. Oliver was a native of Ireland, and his parents emigrated to America in 1840. He began his active career at 14, when he entered the saddlery business with his father, but in 1863 became a shipping clerk for Graff, Bennett & Co. at their iron works in South Pittsburgh.

After a short association with an old rolling mill at Kittanning, Pa., he joined his brother, Henry W. Oliver, who with William J. Lewis and John Phillips formed a bolt and nut plant at Pittsburgh.

In 1880, Mr. Lewis sold out his interest and the company was reorganized as Oliver Bros. & Phillips. Mr. Oliver then became general manager and continued in that position when the firm was incorporated as Oliver Iron & Steel Co. in 1888. In 1900 the company sold many of its important holdings to United States Steel Corp., and Mr. Oliver, at 66 decided to retire from active business.

Mr. Oliver adapted from English practice the sliding scale of wage payments, better known to the industry as the "bar iron scale," which based the tonnage labor rate of puddled iron on the current market price on bar iron. In later years, Mr. Oliver became greatly interested in public school systems, and was president of the Pittsburgh board of public education from 1911 to 1922.

Frank H. Nullmeyer

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James Orr, 67, president, the Orr Iron Co., Evansville, Ind., recently.

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Harry B. Perine, 73, formerly operator of the Perine Machinery Co., Seattle, at Seattle, Oct. 16.

□ □ □

Chas. T. Lehman, 68, president, Lehman Machinery Co., Birmingham, Ala., Oct. 23.

□ □ □

F. W. Adgate, 66, western manager and consultant for the Foundation Co., Chicago, at his home in Wheaton, Ill., Oct. 23.

□ □ □

W. F. Jones, southern sales superintendent, Wrought Iron Range Co., Atlanta, Ga., while on a trip to Anniston, Ala., his old home.

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E. N. Messick, 64, president of the Central States Bridge & Structural Co., Indianapolis, Oct. 20. He was among the founders of the company 30 years ago and was active in civic affairs in Indianapolis.

□ □ □

Herman B. Demmler, 76, vice president of Demmler Bros. Co., Pittsburgh, steel sheet and tin plate jobbers, at Pittsburgh, Oct. 24. He was also vice president of the Western Savings and Deposit bank, Pittsburgh.

□ □ □

Francis James Youngblood, 54, for the past 12 years manager of costs for Detroit Brass & Malleable Works, Detroit and Wyandotte, Mich., Oct. 21. Formerly associated with J. G. Brill Car Co., and British Westinghouse, he was a graduate mechanical engineer of Stevens Institute of Technology, and a member of Delta Tau Delta fraternity and Detroit Engineers' club.

□ □ □

Lewis A. Pease, 50, mechanical engineer, A. O. Smith Corp., Milwaukee, Oct. 18. A graduate of the University of Illinois school of engineering, he served in the navy during the World war. In 1919 he joined the engineering staff of Fairbanks, Morse & Co., at Beloit, Wis., as special consulting engineer, resigning in August, 1933, to become a member of the A. O. Smith staff.

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Harry R. Sinclair, 62, president, Worcester Stamped Metal Co., Worcester, Mass., Oct. 11 in that city. Following graduation from the Worcester Polytechnic institute in 1893, Mr. Sinclair became assistant superintendent of the Builders' Iron Foundry, Providence, R. I., and a partner in the W. & S. Mfg. Co. in 1906. He was elected president of the Worcester Stamped Metal Co. in 1916, the company being the successor to the W. & S. Mfg. Co.

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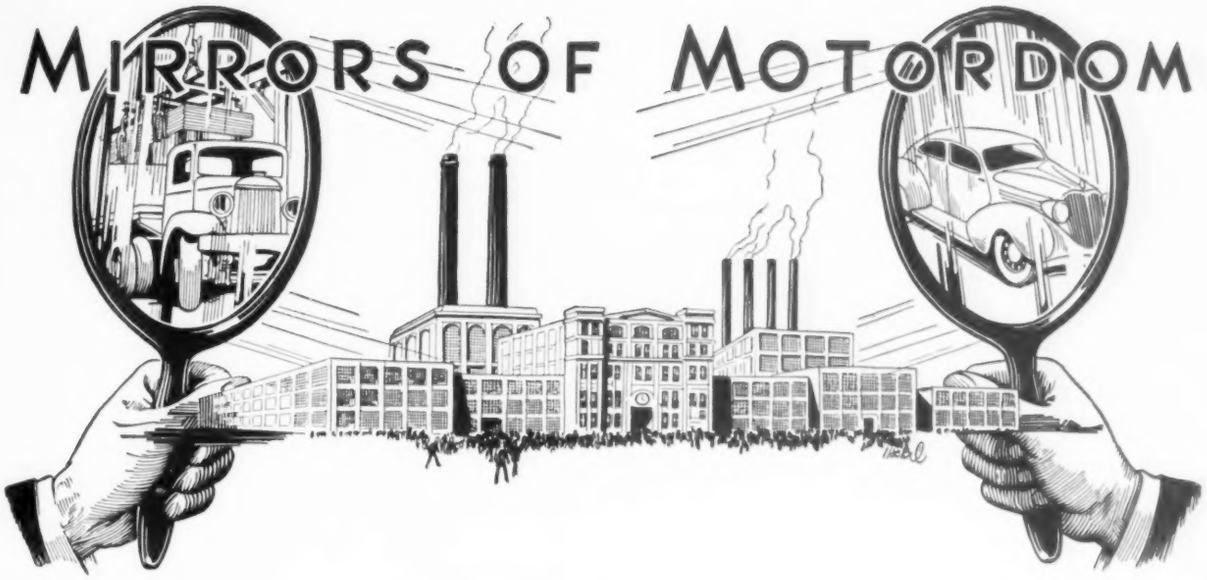
Herbert F. Reese, a former vice president of the Amalgamated Association of Iron, Steel and Tin Workers, Oct. 23 at San Francisco. Mr. Reese had been a mill employe in East Chicago, Ind., later going to Pittsburgh in 1919 when he became vice president of the union. He left the Amalgamated in 1929 and became general superintendent for the Tyler Tube Co., Washington, Pa., and later was affiliated with Bethlehem Steel Co. at Johnstown, Pa.

□ □ □

Reese T. Harris, 74, formerly associated with the Lackawanna Steel Co., Illinois Steel Co., Republic Iron & Steel Co., Wheeling Steel Co., and an adviser to the Pratt & Letchworth Co., Buffalo, until his retirement three years ago, in Buffalo, Oct. 17. Born in Wales, he had worked in iron and steel plants in England and the United States since he was 9 years old and was credited with much of the preliminary work in developing the basic open-hearth furnace.



DETROIT

OCTOBER is shaping up about as expected in the matter of automobile production, the total for the month appearing likely to fall somewhat under 120,000 passenger cars and trucks, which would compare with nearly 135,000 units a year ago.

Unless new car assemblies by some of the largest producers start sooner than anticipated, November will see a further recession, with December marking the turn in the downward trend which by that time will have continued for seven consecutive months.

Motor truck production has been responsible in no small degree for helping to sustain the industry's activity, this month in particular, as well as during the preceding nine months. Operations of a number of commercial car interests, including General Motors Truck, Federal, International Harvester and Diamond T, recently have been maintained close to the September rate in contrast with the drop in passenger car assemblies.

DROUGHT IS NO DETERRENT

Dodge has been building about 900 commercial cars weekly, but its passenger car lines are down. Additional government orders for trucks have given some stimulus to sales lately, while previous federal buying also was a factor in boosting the percentage gain in truck business this year, compared with 1933, to nearly double the increase recorded by passenger units.

Truck purchases by farmers also have snapped back this year, first-half figures indicating the largest gain over the 1933 period of any buyer classification. The drought, incidentally, was not the business dampener to the automotive industry it gave appearances of becoming.

Department of agriculture lists 21 states among the major drought sufferers, yet in this area new car registrations for the first eight months increased 43 per cent over 1933, against a gain of only 32 per cent in remaining states. Some companies made an even better showing, Hudson and Terraplane cars selling 94 per cent better than last year in the drought states and only 57 per cent better in the less arid sections of the county.

Plans of the industry for the remainder of the year lately have shown no major changes. First assemblies of 1935 models will start in several instances either the middle or latter part of November, with public announcements in December. Others will swing over on production in December and present their new offerings about show time.

It now appears that Plymouth will start assemblies by mid-November, Ford in late November and Chevrolet not until December. Pontiac also will be among the early starters in the low-price field. Among the Big Three, Oldsmobile and Pontiac units of General Motors, all of the passenger car divisions of Chrysler, and Lincoln are through with 1934 assemblies, while others, with the exception of Buick, which will wait until possibly next spring before introducing new models, are near the end of this year's runs.

Buick, down the first half of October for inventory, has resumed production but was recently limited to two days weekly by a body shortage. October will see the end of Ford's schedule on present models.

The industry has been faced with a difficult question in deciding the most opportune moment to cease building existing lines and turn to new models. So long as public demand was holding well, there was little incentive to bolster sales with new offerings. A sharp improvement in general business conditions during the past several months would have stimulated buying regardless of the possibility of model changes a short period hence.

FORD STANDS PAT, WINS

Furthermore, this year has demonstrated that revisions in the appearance of cars is not necessary to win public approval. This was illustrated by Ford, which has far outdistanced its competitors in sales gains over 1933 but which made only the slightest of changes in appearance of this year's car compared with its immediate predecessor. The Oldsmobile, another outstanding sales performer in 1934, closely resembles the 1933 car.

On the other hand, LaSalle went streamlined in a big way and helped Cadillac double its production over last year for the first nine months, aided considerably, however, by a sharp price reduction by the former. Chrysler and DeSoto airflows fared poorly in sales compared with 1933

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1932	1933	1934
January	119,344	130,087	156,907
February	117,418	106,888	231,707
March	118,959	118,002	331,263
April	148,326	180,713	354,745
May	184,295	218,347	331,641
June	183,106	253,387	308,051
July	109,143	229,357	266,575
August	90,325	232,855	234,809
September	84,150	191,800	168,872

Estimated by Cram's Reports

Week Ended	
Oct. 6	18,998
Oct. 13	25,491
Oct. 20	29,069
Oct. 27	23,626

business in corresponding conventional models, but this may be attributed to the fact that their design was so radical that the public was not prepared to take the full jump from conservative to extreme practice without becoming accustomed gradually to the latter. With minor changes, airflow models will continue to be offered next year.

While the hoped-for business revival did not appear, car sales have done no worse the past several months than would be expected in view of prevailing conditions. The decline now under way undoubtedly will continue for the remainder of the quarter but will be retarded to a certain extent by dealer price reductions. Some of these have appeared already, Dodge and Plymouth being among the latest.

The retail code makes it necessary for the factory to declare that production of a certain model has been stopped before the seller may obtain permission to lower his quotations. In the meantime, production plans have been gaged so that the start of the flow of new models will follow closely on the heels of last sales of old cars.

It is evident that in preparing for its 1935 campaign the industry as a whole is not spending as heavily as has occurred in instances in the past. One exception is Packard, but this company's plans include a new line of cars. Among the majority of other producers, however, programs projected for new cars lack important changes that involve highly expensive additions or rearrangements to plant facilities. Packard is spending $6,500,000 for tooling, engineering, machinery and equipment and plant rearrangement, a large portion of which will be charged to the low price car to be introduced next year.

FENDERS V-SHAPED

Since changes included in 1935 models principally concern the exterior rather than the mechanical features, there should be little evidence of a reduction in the industry's extra investment in its new products. As previously indicated, the tendency toward more streamlining will continue, with the radiator design leaning to the narrow, rectangular style sponsored this year by LaSalle. This, incidentally, is more or less patterned after the radiators used on racing cars for many years.

More fenders next year will have a v-shaped cross section, another LaSalle feature. Bodies will be roomier, with the back slope away from the car a concession to streamlining. Graham has adopted the latter style of back on 1935 models. Ford, it is understood, will widen its bodies so that three persons can ride more comfortably in the driver's seat. Some body tops will be made completely of steel.

Mechanically, new models appear likely to experience but few additions or revisions. The overdrive transmission, a device which mechanically gives the car a fourth and higher forward gear after it has attained a certain speed was incorporated in the Chrysler airflow this year and will be adopted by certain other interests in 1935, including Dodge, Nash, Reo and Studebaker. Warner Gear Co., Muncie, Ind., manufactures the equipment. Free wheeling and automatic clutch, on the other hand, continue to lose favor and will be dropped by additional car builders.

Studebaker assembly lines were down last week, production of 1934 models having been completed the previous week when output was increased 1000 units to 1600. New models are expected to be started by the end of November. Orders for certain parts have been placed and foundry operations resumed.

FORD OFFERS NEW HEATER

What Ford terms air-conditioning is being made available to owners of 1933 and 1934 Ford V-8's with the announcement of a fresh-air heater, which is claimed to utilize a brand new principle in heater design.

It is built just like a boiler, with 24 flues, each 13 inches in length, providing almost 500 square inches of heat radiating surface. The unit is a rigid, integral part of the engine exhaust line. The extremely hot exhaust gases from the engine are passed through the flue tubes. Fresh air forced through the heater by the fan is blown around the outside of these tubes, instantly heated and passed on into the car.

The heat register is installed in the right dash wall, in front of the front-seat passenger. The heat supply may be regulated or may be shut off completely by a button controlling a valve in the intake pipe which may be operated by the foot. The heat supply also can be directed to any part of the front compartment. Provision is made for the installation of a second heat register in the floor of the tonneau if desired.

MOTORDOM SHORTS

Pontiac will use a molybdenum-titanium iron casting for its 1935 clutch plate. . . Pierce Governor Co., Anderson, Ind., as during the past two years, will continue to furnish automatic choke equipment to Chrysler, recently having received a contract renewal. . . Chevrolet again will have first choice of exhibit space at the 1935 New York show. This choice, awarded to the manufacturer with the largest dollar volume sales, has gone to Chevrolet for eight consecutive years, although Ford was not a member of the national automobile chamber of commerce during that period. Ford will exhibit at the next January show which will be under the direction of the Automobile Merchants Association of New York. . . . Chevrolet has added a four-door, five-passenger sedan to its lower priced line of standard models. . . Tropic-Aire Inc., Minneapolis, which is working three shifts to ship 2000 heaters a day, is starting to bring out a motor robot, which automatically starts and stops the motor and keeps it ready for quick starting. . . September production of passenger cars and trucks in the United States slightly exceeded estimates, being 168,872 units compared with 234,809 in August. In September, 1933, production was 191,800 units.

Here and There In Industry

TIMKEN ROLLER BEARING CO., Canton, O., has received an order for roller bearings for trucks for the 10 new locomotives being built for the Boston & Maine by Baldwin Locomotive Works, Philadelphia, and Lima Locomotive Works, Lima, O. Timken roller bearings and boxes have also been specified by this railroad for two self-propelled coaches being built by the St. Louis Car Co., St. Louis.

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Baldwin Locomotive Works, Philadelphia, has appointed Carr Bros. Inc., New York, its exclusive agent for Mexico. Sale of Baldwin products and products of other companies which Baldwin represents in Mexico will be handled by Carr Bros. Inc. representative, P. G. Cheatham, 2-A Venustiano Carranza No. 48, Mexico, D. F.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has taken one of the largest orders for transformers placed in five years, amounting to about $1,000,000, for the bureau of power and light, Los Angeles. The order includes seven 65,000-kilovolt-ampere transformers, to step down current from 286,000 volts to 132,000 volts at the Los Angeles end of the transmission line from Boulder dam. Each unit weighs about 500,000 pounds, is 35 feet high and occupies 19 x 20 feet of floor space.

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B. F. Sturtevant Co., Hyde Park district, Boston, has the contract for ventilating fans, Broadway low-level vehicular tunnel, between Alameda and Contra Costa counties, California. The total capacity of the Sturtevant fans will be about 2,000,000 cubic feet of air per minute, or 70 tons. There will be 16 fans, eight for supply service and eight for exhaust. The tunnel will be of two parallel bores type. Each bore will be 3168 feet long and will have a 22-foot roadway and a 3-foot sidewalk.

Industrial Men in the Day's News

Dan M. Avey, New President American Foundrymen's association

Born in Illinois, he has devoted most of his energies to publication work in various fields.

For 17 years he has been associated with Penton publications, is now editor of The Foundry.

He has been active with various foundry associations, both in this country and abroad.

DAN M. AVEY, who last week was elected president of the American Foundrymen's association at the fifth international foundry congress in Philadelphia, is a native of Charleston, Ill., and a 1910 graduate in civil engineering from the University of Illinois, Urbana, Ill.

Following his college career, he became associate editor of *Municipal Engineering* in Indianapolis, and after a year at this work was named publication supervisor at the engineering experiment station of the University of Illinois. He occupied the latter post for five years.

After a year as assistant cashier of the Central Illinois Trust & Savings bank, he removed to Cleveland to become asociate editor of *Iron Trade Review*, predecessor of STEEL. In 1919 he was named managing editor of *The Foundry*, another Penton publication. In 1928 he was chosen editor of the latter magazine, a position which he continues to hold.

He has been particularly active in foundry association work, both in this country and abroad, being a member of the American Society for Testing Materials, Institute of British Foundrymen, England, and the Association Technique de Fonderie de France. He is a past director of the American Foundrymen's association and vice president in 1933-34.

He was chairman of the international relations committee of the association and in charge of the overseas party during its preconvention tour of leading industrial centers. He has served on a number of association committees, including the papers and pattern standardization groups.

For several years he was secretary of the Foundry Equipment Manufacturers association.

Mr. Avey is the second member of the Penton organization to be honored by the American Foundrymen's association as its president. The late A. O. Backert, who also was editor of *The Foundry*, was inducted as president of the association at Milwaukee in October, 1918.

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K. C. Gardner, vice president in charge of machinery sales for United Engineering & Foundry Co., Pittsburgh, has had his duties extended to include vice presidency for the sale of all the products made by the United company. Mr. Gardner's new title is vice president in charge of sales.

Horace Mager, formerly in the roll sales department for the company, now supervises the roll and steel casting sales division.

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Frank J. Johnson has resigned as president of the American Hoist & Derrick Co., of St. Paul. Mr. Johnson, with Oliver Crosby, founded the American Mfg. Co. in 1882, manufacturing hand power hoists and derrick equipment. In 1892 the company was reorganized as the American Hoist & Derrick Co., enlarging its manufacturing facilities and consequently producing a complete line of hoisting and earth moving machinery, including power hoists, steel derricks, railroad ditching and maintenance machines, locomotive cranes, shovels, the "Crosby" wire rope clip, and kindred items.

Frederic Crosby, son of Oliver Crosby, succeeds Mr. Johnson, Howard S. Johnson, son of Frank J. Johnson, retains his title as vice president, and Harold O. Washburn, formerly general superintendent, has been appointed vice president and treasurer to succeed Mr. Crosby.

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F. R. Fishback, president, Electric Controller & Mfg. Co., Cleveland, was elected vice president of the National Electrical Manufacturers association by the board of governors at the association's recent annual convention in Chicago.

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R. R. Lally for several years manager of sales at New York for the Globe Steel Tubes Co., Milwaukee, has been made vice president in charge of eastern sales for this company.

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Walter S. Carr, president of the Locomotive Firebox Co., Chicago, has been elected president of the Illinois chamber of commerce.

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Darwin S. Luntz, of Luntz Iron & Steel Co., Canton, O., has been elected president of the Canton chamber of commerce. Mr. Luntz, who has been an active leader in his community for many years, in business, industrial and civic affairs, is a member of the board of directors of the Institute of Scrap Iron and Steel. He is also vice-chairman of the national code authority for the scrap iron and steel industry. For several years he was president of the Cleveland-Detroit chapter of the institute.

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William Spraragen, who for the past 15 years occupied the position of secretary of the division of engineering and industrial research of the National Research Council, has become president of the newly-organized Spraragen Engineering Corp., 10 East Fortieth street New York. This firm will specialize in servicing companies with up-to-date expert welding engineering information. Mr. Spraragen continues as secretary of the American Bureau of Welding.

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John G. Zummach, formerly with the Young Radiator Co., Racine, Wis., has been appointed chief engineer in charge of the air conditioning division of the Hexcel Radiator Co., Mil-

(*Please turn to Page* 69)

EDITORIAL

NRA Has Chance To Aid Self-Government in Industry

IN STATEMENTS made in regard to the reorganization of NRA, emphasis has been placed upon the desirability of promoting self-government in industry. It is presumed that the representatives of the national administration responsible for these statements mean that the function of regulating trade practices is to be transferred from the government to industry.

Many industrialists will welcome this change. In principle, self-government is much to be preferred over regulation by a government agency. In practice, however, the difficulties involved in establishing and maintaining standards of fair practice in industry by means of self-government are as great as or greater than by policing by the government. For this reason, representatives of NRA and of industry who are engaged in redesigning the machinery of code administration should guard against underestimating the complexities of the job.

One reason why NRA under General Johnson had so much difficulty in attempting to promote fair competition was that the general ignored many of the lessons afforded by industry's experiments in self-government in the decade prior to the depression. It is not surprising that the results of this experience were shunned or overlooked, because in the early stages of NRA the brain trusters scorned anything and everything that transpired before March, 1933. Had they cared to investigate, they could have learned much from the activities of trade associations, the department of commerce and the federal trade commission in the decade which followed the World war.

Valuable Lessons in Self-Government Gained Under Hoover as Commerce Secretary

The efforts of industry to govern itself were stimulated more by Herbert Hoover, while he was secretary of commerce, than by any other individual before or since that time. Mr. Hoover believed that trade associations should be encouraged to collect statistics and engage in other activities which would help to provide information necessary for self-government. He attempted to obtain an authoritative interpretation of the anti-trust laws which would enable industry to know exactly how far it could go in the exchange of price information without transgressing the law. To encourage self government, he broadened the statistical service of the department of commerce and later set up a fair practice division of the federal trade commission.

No one would say that self-government of industry as stimulated by Mr. Hoover proved entirely successful. There were many shortcomings. For instance, many trade associations were not truly representative of their industries. Interpretation of the anti-trust laws was not clear, nor could one depend upon a continuing, consistent interpretation. Congress always eyed self-government of industry with suspicion.

Large NRA Power Gives Opportunity To Use Established Business Machinery Effectively

Notwithstanding these handicaps, some worthwhile progress was recorded, and—most important of all—certain well defined conclusions were developed from the almost 10 years of experience. For instance, it was demonstrated that a trade association cannot be an effective agency for self-government unless it is ably managed and is representative of an overwhelming majority of the units of its industry. The experience also proved that moral suasion alone is not strong enough to prevent offenders from violating standards of fair practice. The consensus of opinion of those most familiar with attempts at self-government in that period is that some force higher than moral suasion—perhaps intelligently administered government policing—will be necessary until business executives become educated to the point where pure self-government can stand on its own feet.

The new advisory board of NRA can salvage part of the present NRA machinery if it will heed some of these lessons learned in the postwar period. Thanks to NRA, the trade associations in many industries are stronger and more representative than ever before. NRA today, unlike Secretary Hoover in the twenties, has the advantage of almost unlimited authority. Also, under the present set-up, it is possible to combine co-operation between companies in a given industry with government police power in the proper proportion to insure effective compliance.

Satisfactory self-government in industry will not be achieved overnight. It will require many years of development. Nevertheless, NRA today has a wonderful opportunity to stimulate its progress.

THE INDUSTRIAL DIAL

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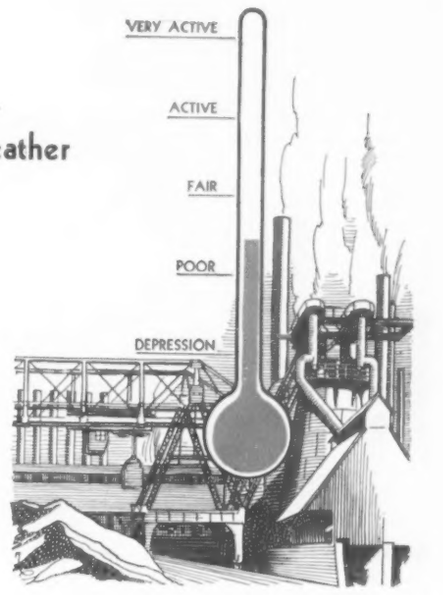
Industrial Weather

TREND:

Uncertain



BY FAR the most important factor affecting the trend of business at the moment is the changed attitude of the national administration toward finance and industry. The present condition of cordial relations between government and business is so new and represents such a complete about-face from the previous state of affairs that one hesitates to appraise it. The hint of artificiality is too strong to be ignored.

Nevertheless the extending of the olive branch by the government administration has buoyed business sentiment during the past few weeks. For the first time in many months it may said that sentiment is better than business. Until recently the reverse was true.

Actual conditions in the industrial world have changed only slightly during the month. Steelmaking operations have fluctuated within a range of a few per cent about midway between 20 and 25 per cent of capacity. Revenue freight car loadings have been up and down slightly. Preliminary figures for the week ending Oct. 20 indicate a probable gain over the previous week. Electric power output in the week ending Oct. 20 totaled 1,667,505,000 kilowatt hours, a gain of 2.3 per cent over the previous week and 3 per cent ahead of the output in the corresponding week of 1933. New England was the only region in which power output declined from the 1933 level. The gains in the southern and Rocky mountain states and in the central industrial region were higher than in the previous week. In general, industrial activity in October was marked with uncertainty. The weekly business indicators moved erratically throughout most of the month.

Earning's statements for the third quarter, which now are beginning to appear, reflect the drop in the volume of business which began in June and continued into September. Management was unable to retrench fast enough or dras-

The Barometer of Business

Industrial Indicators

	Sept., 1934	Aug., 1934	Sept., 1933
Pig iron output (Daily average, tons)	29,969	34,199	50,264
Machine Tool Index	37.4	37.1	30.9
Finished steel shipments (tons)	370,306	378,023	575,161
Ingot output (Daily average, tons)	50,065	50,495	87,811
Dodge Bldg. owards in 37 states (sq. ft.)	12,510,300	14,259,000	12,867,400
Automobile output	174,451	244,713	201,890
Coal output, tons	27,670,000	27,462,000	29,500,000
Business failures, number	790	929	1,116
Business failures, liabilities	$16,440,147	$18,459,903	$21,846,906
Cement production, Bbls.		7,863,000	5,638,000
Car loadings (weekly av.)	624,121	604,977	640,910
Cotton consumption, bales	296,000	420,949	499,486

Foreign Trade

	Sept., 1934	Aug., 1934	Sept., 1933
Exports		$171,965,000	$160 000,000
Imports		$119,515,000	$147,000,000
Gold exports		$14,556,000	$58,281,000
Gold imports		$51,781,000	$1,544,000

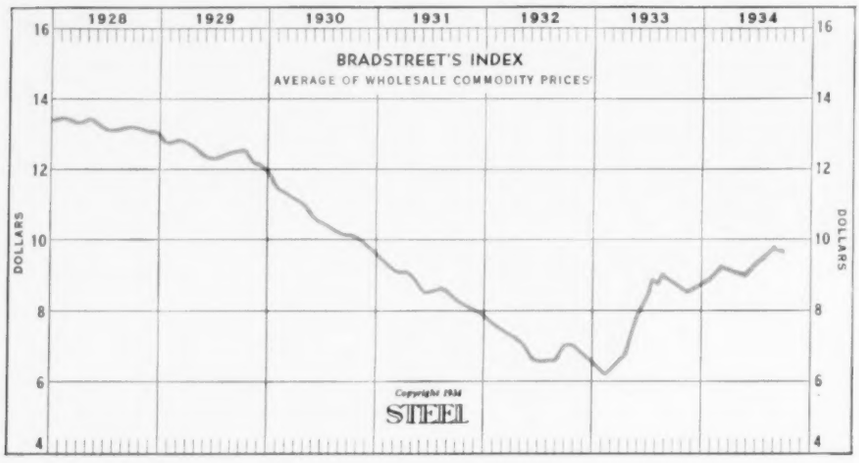
Financial Indicators

	Sept., 1934	Aug., 1934	Sept., 1933
25 Industrial stocks	$129.47	$130.46	$136,44
25 Rail stocks	$27.30	$28.19	$38.51
40 Bonds	$78.71	$80.04	$74.26
Bank clearings (000 omitted)	$16,944,912	$16,132,872	$16,665,333
Commercial paper rate, New York (per cent)	1	1	1½
*Commercial loans (000 omitted)	$7,793,000	$4,555,000	$8,540,000
Federal Reserve ratio, per cent	70.1	70.2	66.1
**Railroad earnings	$39,677,337	$35,220,889	$61,401,986
Stock sales, New York stock exchange	12,635,980	16,693,492	43,319,334
Bond sales, par value	$286,485,800	$316,504,600	$231,353,400

*Leading member banks Federal Reserve System.
**August, July and August, respectively.

Commodity Prices

	Sept., 1934	Aug., 1934	Sept., 1933	Aver. 1913
STEEL's composite average of 25 iron and steel prices	$32.15	$32.24	$30.36	$26.32
Bradstreet's index	$9.45	$9.47	$9.05	$9.21
Wheat, cash (bushel)	$1.17	$1.17	$1.03	92c
Corn, cash (bushel)	93c	90c	64c	51c
Petroleum, crude (Bbl.)	98c	94c	98c	$2.50



	1934	1933
October 1	$9.45	$9.05
September 1	9.47	8.99
August 1	9.32	9.00

tically enough to keep pace with the sharp decline in volume in the summer months. The outlook for earnings in the fourth quarter is only slightly better.

Commodity prices have been maintained at moderately higher levels during the past month.

Where Business Stands

Monthly Average, 1933—100

	Sept., 1934	Aug., 1934	Sept., 1933
Steel Ingot Output	67.8	68.4	118.9
Pig Iron Output	82.7	94.4	138.8
Freight Movement	112.1	108.6	115.1
Building Construction	102.1	116.3	105.0
Automobile Output	103.4	139.3	119.6
Wholesale Prices	120.2	120.5	115.1

Finished steel prices are roughly 10 per cent higher than they were a year ago.

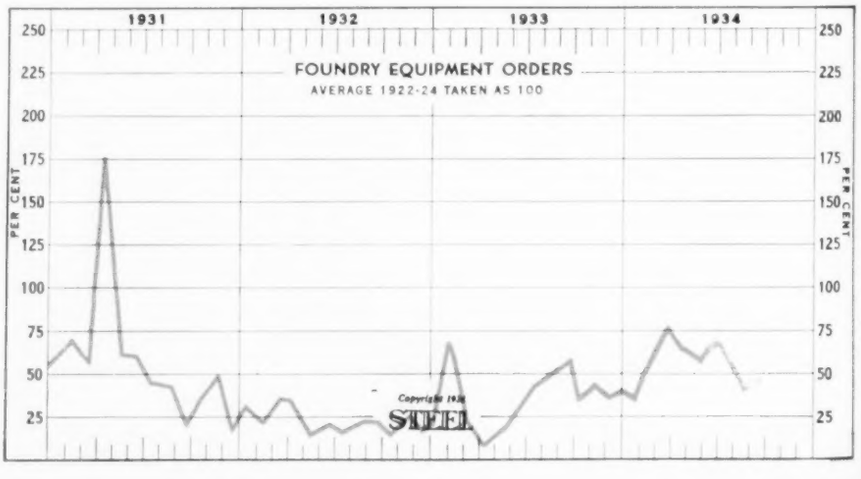
While the approaching elections should have little direct bearing upon business, it is likely that once the results are known, a more positive tone will be manifested. A few signs already indicate that improvement in industrial activity may be expected in November.

Commodity Prices Advance 48.8 Per Cent Since March 1, 1933

Dun & Bradstreet latest report of wholesale commodity prices on Oct. 1, stood at $9.45, a decline of only 0.2 per cent from the Sept. 1, figure of $9.47, the highest reached since January, 1931. The Oct. 1 index compares with $9.05 on the same date of 1933, a gain of 4.5 per cent, and shows a total rise since the first of the year amounting to 7.1 per cent. Since March 1, 1933, the index has risen 48.8 per cent.

September Foundry Equipment Orders Point Upward

Foundry equipment orders increased during September, according to the monthly report of the Foundry Equipment Manufacturers association. The index of gross orders was 46.43. This compares with 43.1 in August and 34.9 in September, 1933. Shipments declined from 48.7 to 37.0 in September. The index of unfilled orders advanced 10 points to 46.7 and compare with 32 in the comparable month in 1933. Twenty-one manufacturers reported for September, the same number as reported for August.



	Per Cent
September, 1934	46.4
August, 1934	43.1
September, 1933	34.9

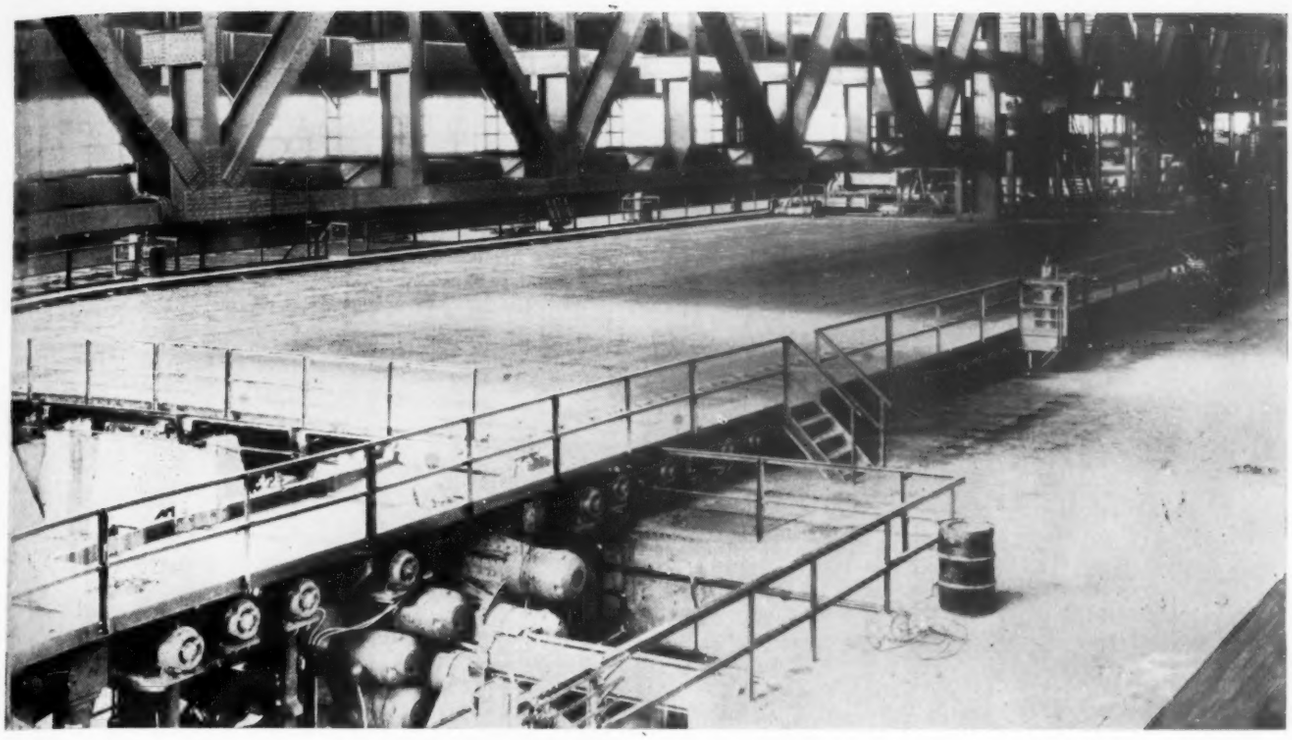


Fig. 1—Table rollers on 72-inch mill driven individually by squirrel-cage motors which operate on adjustable frequency and voltage to provide a table speed of 600 to 1200 feet per minute

INDIVIDUAL MOTOR DRIVES SERVE RUNOUT TABLE AND COILERS

BY C. V. GREGORY
Engineer, Reliance Electric & Mfg. Co., Cleveland

SUCCESSFUL operation of any continuous strip mill depends on the ability of the hot runout table and coilers to keep going and handle the strip as fast as the mill delivers it to the table. It is on this equipment that individual motor-drives are used to best advantages. A drive that is flexible and can provide rapid acceleration and ability to stop the complete table in a matter of seconds is of utmost importance.

In the summer of 1931, the installation of two modern continuous strip mills was started at the Riverside plant of the Otis Steel Co., Cleveland—a 20-inch and a 72-inch mill. Special acknowledgement is given to the United Engineering & Foundry Co., and the Otis Steel Co. for the table and coiler design and to R. H. Ellis and J. O'Malia, electrical engineers respectively of these two companies.

The run-out table on the 20-inch mill consists of 76 rollers of 9-inch diameter each having a WR^2 of approximately 30 pounds feet squared. These rollers comprise the connecting link between the last stand and the coilers or cooling bed. The range of speed on this table is from 600 to 1200 feet per minute.

The motors driving the rollers are connected to them through flexible couplings, without gears, and are located in an easily accessible position. The motors are rated ¾ to 1½ horsepower, 16 2/3 to 36 2/3 cycles, 153/336 volts, 3-phase, having a synchronous speed of 250/550 revolutions per minute. A test sheet showing performance curves of these motors is shown in Fig. 4.

As will be noticed at the top of the sheet the torque is not constant, but falls off rapidly on low frequency. However, from 10 cycles up to 60 cycles the variation is only from 18 to 27½ pounds at 1-foot radius.

Similarly, the locked current is not a straight line as might be expected considering that the voltage applied to the motor is proportional to the frequency. This is due to the fact

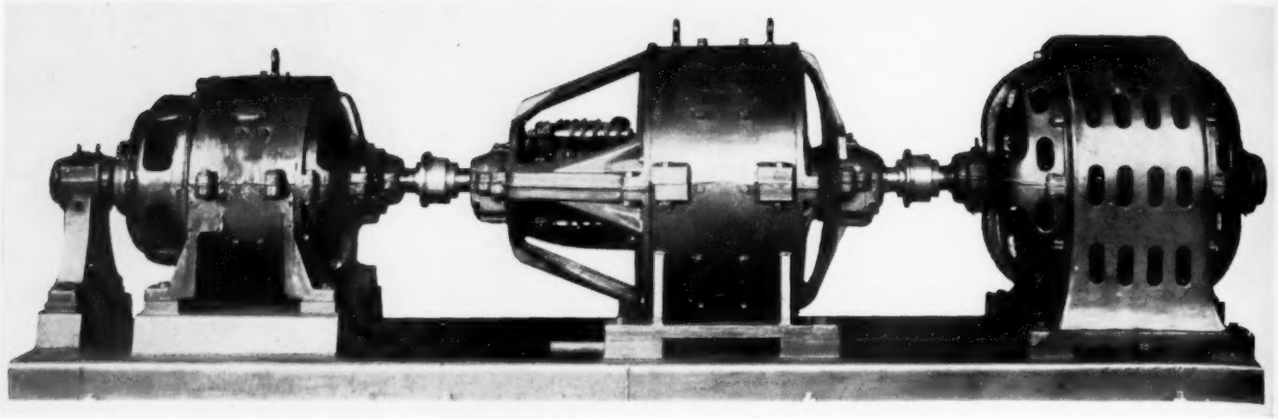


Fig. 2—Alternator set which supplies current for operating runabout table motors on a variable frequency. The low-voltage direct-current generator supplies power for electrical braking

that as the frequency is increased the impedance is increased due to the increased reactance; so that the current is not increased proportionately to the voltage.

The no-load current is practically constant at all frequencies when the voltage applied is proportional to the frequency. Also the watts at no load, which include iron loss plus friction, do not vary over a wide limit although this is not true of all motors. It is true in this case on account of the fact that the motor is an eight-pole motor whose magnetizing current is fairly large and the no-load copper loss forms an appreciable amount of the no-load loss. The no-load watts include, besides the friction and windage and iron loss, this no-load copper loss.

The control is entirely automatic and is operated from a high pulpit at one side of the building. The total 76 motors are divided into four groups of approximately equal numbers of motors in each group but the control is arranged so that when the main contactor closes, these groups come in at intervals of about one second apart. The idea of starting up the motors in this way is to economize on the capacity of the alternator necessary to drive this table.

Serves As a Link

This table forms a link between the last stand and the coilers or cooling bed. When the coilers are used the strip passes over the rollers, with these rollers operating continuously in the forward direction. When the strip is to be pushed off on the cooling bed, the rollers are stopped by braking the motors with direct current. This braking is automatically controlled in such a way as to throw direct current through a set of direct current contactors on all the motors at one time. The direct current contactors are interlocked with the alternating contactors so that it is impossible for one to come in with the other already in. The time differential between the four groups of motors is also eliminated when the motors are stopped so that all the motors receive current at the same instant. The same wiring, which is used for the alternating current supply, is used for conveying the direct current to the motors for stopping. In braking, two of the three supply wires only should be used. One lead is connected to one side of the direct-current circuit and the second wire to the other side, the third lead being left open.

The current required to stop these motors in approximately 1½ seconds, together with their connected roller, varies from 6.3 emperes at 250 revolutions per minute to 14.5 amperes at 550 revolutions per minute. One of the advantages found with this

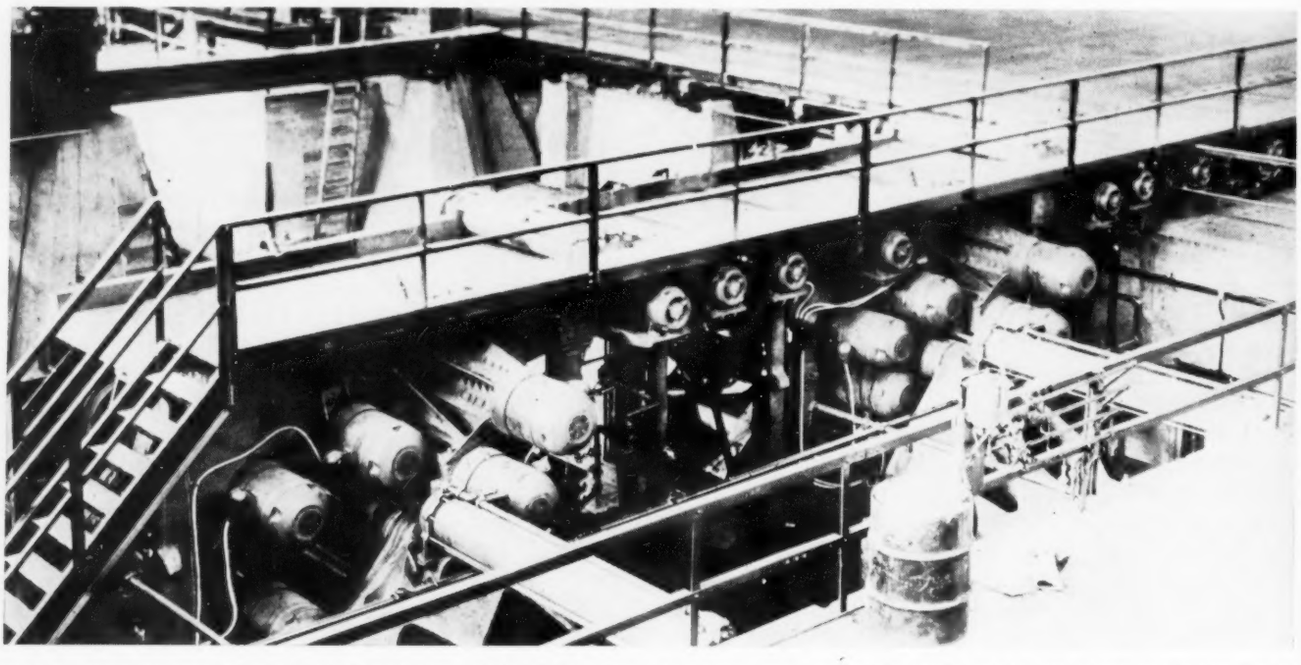


Fig. 3—Two coilers serving a 72-inch hot strip mill each of which are equipped with eight fully-enclosed fan-cooled squirrel-cage motors

particular installation was that with the field of the direct-current plugging generator set at one value, the variable voltage obtained from the direct-current armature with this constant field gave sufficient current to stop the motor at any particular point over its speed range at approximately the same time. In other words as the speed of the motor is decreased, the amount of direct-current required to stop it at a given time is decreased and in this particular case a constant field current gave good results throughout the entire range of speed of the motors. The cycle of operation called for on these particular motors was two seconds for acceleration, 6.5 seconds running and 2 seconds for stopping, giving a total cycle of 10.5 seconds. The roller speed specified for this cycle was 470 revolutions per minute.

On the 72-inch mill there are 71 rollers, 10 inches diameter, spaced 30 inches on center, each driven by a direct connected open-type motor rated 1 to 2 horsepower, 16/32 cycles, 149/296 volts. These motors, shown beneath the walkway at the right of the cooling bed (Fig. 1), operate on adjustable frequency and voltage to provide operating speeds of the table of 600 to 1200 feet per minute. Power is supplied from a 250 kilovolt-ampere alternator driven by a 200 horespower adjustable-speed direct-current motor. This comprises a motor-alternator set and includes a low-voltage direct-current generator which supplies direct current for braking the motors.

Inrush Is Minimized

The running load of these roller motors is relatively low compared to the starting load or kilovolt-ampere inrush. By arranging the starting of the rollers in groups as stated this inrush is kept to a minimum with the result that a correspondingly smaller alternator can be used. (The voltage on such a set must be maintained as well as possible during the starting period so that full starting torque can be developed by the motors to accomplish rapid acceleration.) This is aided by overexciting the alternator field during the starting period. This sequence starting is accomplished in approximately 7 seconds at which time the 71 motors are up to full-load speed.

The duty-cycle under which these motors operate and which occurs two or three times a minute is as follows: Starting—7 seconds, run—10 seconds, stop—2 seconds. On the average 120 stops per hour are made and each in a short time interval of 2 seconds or less.

The front end of a strip comes through the last stand with the table rollers running conveying the strip at high speed until the tail-end clears the mill. The rollers are stopped quickly and the strip is transferred by mechanical kickoff to the transfer table, or cooling bed. Promptly the table rollers are started again to handle the next piece of strip as it comes through the mill. Occasionally it is necessary to start the table with the long strip still resting on the roller. At such times all rollers are started simultaneously with the resulting longer period of acceleration to full speed. Mill operations are continuous in the order as previously shown utilizing the cooling bed or coilers as the case requires.

The quick stop from full running speed in two seconds is accomplished again by direct-current braking. This is the only hot bed installation in the country where the stopping of the table motors is performed before removing the strip from the table under conditions of 1200 feet per minute speed in as little as 40 feet travel of the strip on the table for this operation.

The two coilers on this mill of the internal expanding reel type each are equipped with eight fully-enclosed, fan-cooled, Reliance motors rated 3 to 7½ horespower 10/30 cycles, 137/411 revolutions per minute, as shown in Fig. 3. Due to the construction of the coiler, these motors were built with a special steel adapter for flange mounting. They are water-tight and dust-tight and mechanically strong enough to withstand the shock loads applied by the coiling strip. They are designed electrically to stand the rapid acceleration and across-the-line starting. Direct-current braking is also used effectively on these coiler motors to stop the entire reel with a 3500-pound bundle in 3½ seconds from 1500 feet per minute speed.

The importance of stopping time on such installation is realized by considering the maximum rate of speed traveled by the strip which is 2000 feet per minute across the table. Suppose a cobble occurs or some emergency calling for a sudden stop of the roller and perhaps coiler motors. Every second means additional tie-up on the mill and plugging to stop is not enough to prevent further damage. This stopping is mentioned as occurring only in case of emergency, but it actually is used throughout all phases of production. Suppose the strip is traveling 2000 feet per minute. The table must be stopped immediately and if plugging

(*Please turn to Page* 39)

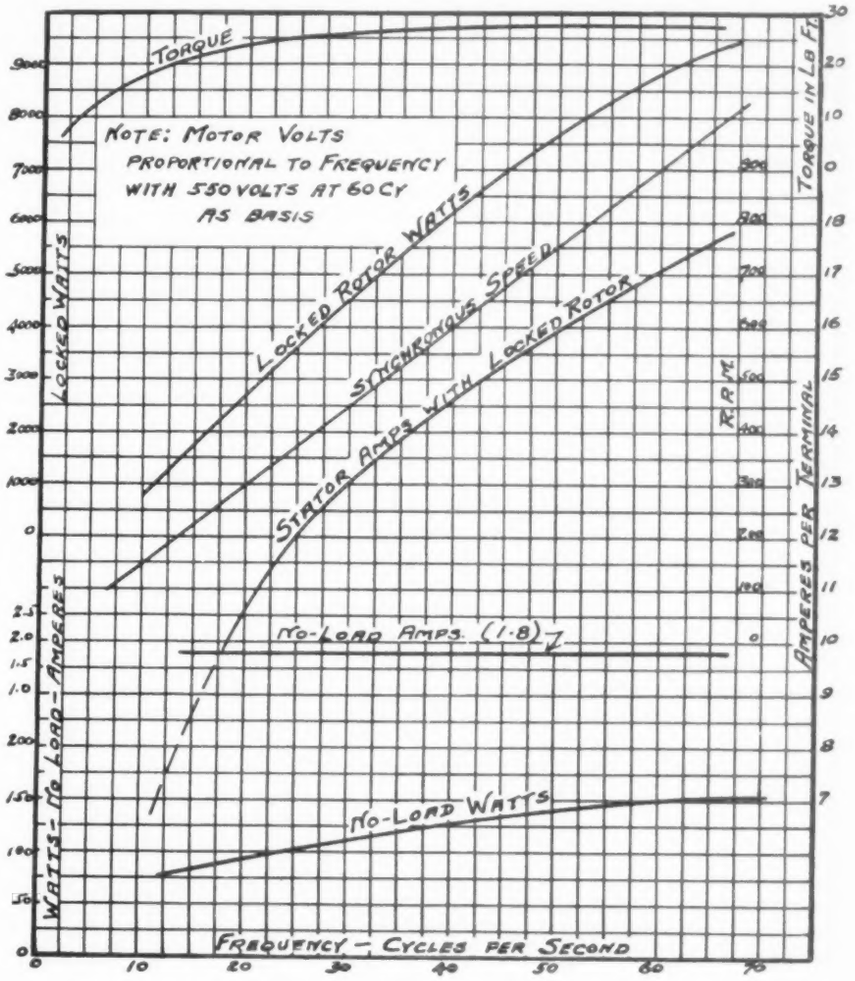


Fig. 4—Test sheet showing performance curves of table roller motors

White Castles Constructed of Porcelain Enameled Sheets

IN 1925, the White Castle System Inc., then known as The White Castle System of Eating Houses Corp., with general headquarters in Wichita, Kansas, completely lined the interior of one of its White Castles in St. Louis with white porcelain enameled steel sheets.

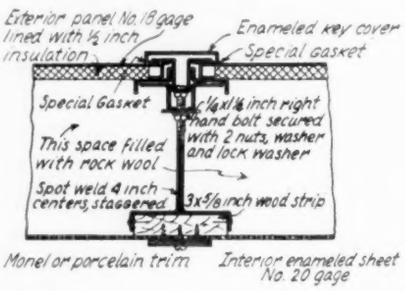
So satisfactory was this experiment that, according to E. W. Ingram, president of the company, the idea immediately was conceived that this same treatment could be extended to the exteriors of buildings.

After several years of extensive experimenting, the company's first steel fabricated building, with porcelain enameled panels for both interior and exterior, was produced and placed in operation early in 1929. This now is the only method of construction used by the White Castle System Inc. Today 20 of its 125 units in 16 metropolitan centers of the United States are provided with porcelain enameled steel exteriors and interiors, while all of the 125 units have porcelain enameled interiors.

Patented Key-Locking Device

The use of porcelain enameled panels for building exteriors of this type was made possible by a patented key-locking device invented by L. W. Ray, superintendent of construction for the company, the patents being owned by White Castle System Inc. Buildings of this type now are being marketed for other purposes by the Porcelain Steel Buildings Co., a division of the White Castle System. In addition to the 20 White Castles of this construction that have been built in the past five years, filling stations have been erected under the same patents for some of the larger oil companies.

Fabricated in the factory, the resultant building can be erected on its location in a few days. With porcelain enameled exterior and interior walls, it requires practically no attention and undergoes little depreciation over a period of years. It has, in addition, the advantage of easy portability. The first White Castle of this type, built more than five years ago, has been moved twice, and still has no maintenance cost marked against it except for a broken window pane.


Exterior panel No. 18 gage lined with ½ inch insulation
Enameled key cover
Special gasket
Special Gasket
1¼x1¼ inch right hand bolt secured with 2 nuts, washer and lock washer
This space filled with rock wool
Spot weld 4 inch centers, staggered
3x⅝ inch wood strip
Monel or porcelain trim
Interior enameled sheet No. 20 gage

Typical details of side wall stud of White Castle structure, showing also details of key-locking device

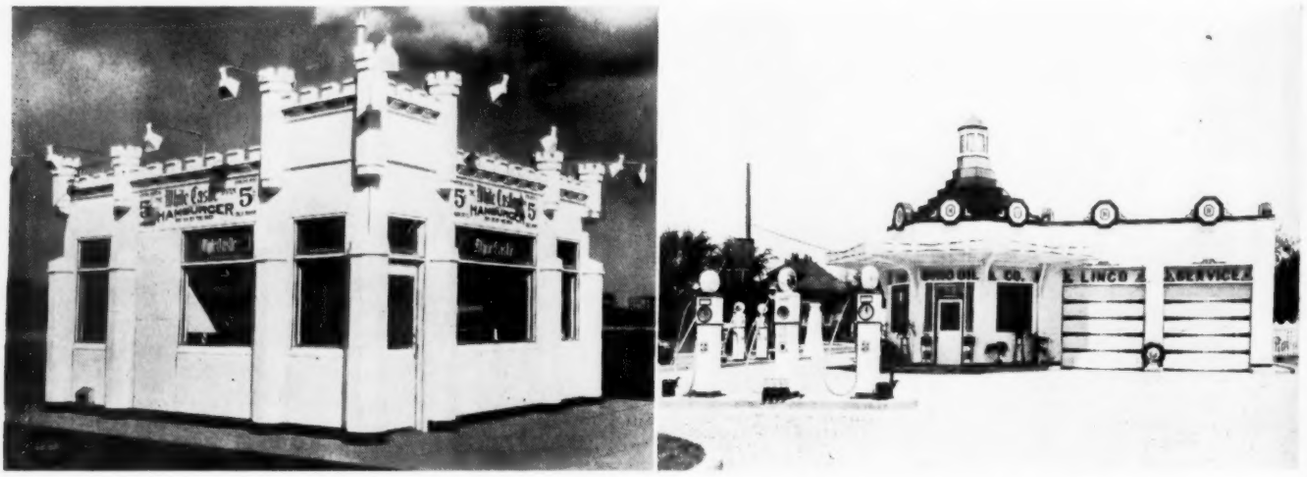
The building is so constructed that its exterior is devoid of any screw or bolt heads, the patented key device eliminating any such evidence of its manner of construction. An unlimited variety of color and design is possible, inasmuch as the porcelain enamel lends itself to any possible color scheme and the process of construction to any desired type of architecture.

Fire hazard on this building is reduced to zero. Packed with rock wool in the average 4-inch space between the walls, and with the outside walls lined with additional insulating material, an insulating efficiency is obtained equal to 20 inches of masonry by actual test. The original building, when first erected in the spring of 1929, was subjected to an accidental test along this line of the most severe nature. A number of tar barrels around its base on the outside caught fire. To extinguish the blaze, which became extremely hot, water under high pressure was played on the building. Not a drop of water permeated the panel joints. The extreme temperature changes had no effect, and the black scot from the fire was quickly washed off the enamel. The same building, with the same enameled panels, is doing duty today, looking as good as new.

Blown-Up Parts Made in Dies

Blown-up portions of these buildings are formed in steel with dies, welded and then enameled. They are provided with the necessary means of hanging them on the framework, most of them being fastened on with the regular patented key-locking device that is used on the panels.

Fabricating of these buildings the past two years has been done by the Brasco Mfg. Co., Harvey, Ill., and the enameling by the Chicago Vitreous Enamel Co. This fabricating now is being done in the new plant of the Porcelain Steel Buildings Co. at Columbus, O. To the new Columbus location, also, have been moved the general offices of White Castle System Inc.



Porcelain enameled steel structure, standard with White Castle System Inc., is shown at left. It is of steel inside and out, with considerable monel metal used as interior trim. Elasticity of this type of construction, from an architectural viewpoint, is illustrated by the view at the right, showing a filling station erected for the Ohio Oil Co. at Columbus, O.

Gear Manufacturers Review Their Technical Progress

TECHNICAL subjects predominated on the program of the seventeenth semiannual meeting of the American Gear Manufacturers' association, held in Milwaukee, Oct. 22-23. More than 50 members and guests attended. While commercial phases of the industry, including its code, also received consideration, papers delivered dealt principally with features of gear design, production and use.

The opening session, under the chairmanship of John Christensen, president, Cincinnati Gear Co., Cincinnati, and president of the association, included consideration of business matters and reports of officers. Manager-Secretary J. C. McQuiston announced that company membership in the association now numbers 81.

President Christensen praised the work of the industry's code authority for its successful handling of problems which have arisen since its formation. A report presented at the afternoon meeting by Code Authority Chairman H. H. Kerr, president, Boston Gear Works Inc., North Quincy, Mass., indicated that the gear industry has been singularly free of major difficulties in the administration of its code and that what violation complaints had arisen have been speedily settled.

Factors in Gear Design

Two papers were read at the morning session—"Helical Gears in Retrospect and Prospect," by P. C. Day, Falk Corp., Milwaukee, and "Advantages of Sykes Herringbone Gears," by W. E. Sykes, Farrel-Birmingham Co. Inc., Buffalo. Mr. Day traced the history of the modern helical gear from the invention of the Wuest gear, 30 years ago, to its present development. Large Wuest gears first were put in service in this country in 1911, one of the initial installations being for an engine-driven sheet mill at Farrell, Pa. Since that time the introduction of alloy steels and heat-treatment, as well as the increase in loading and stresses on gears used in certain types of equipment have necessitated closer attention to the basic theory of gear design.

The speaker pointed out, moreover, that the capacity of gears is not entirely a matter of their dimensions or of the physical properties of the materials from which they are made since the design and rigidity of the supporting structure, the choice of suitable bearings and the selection of the proper kind of lubricant and the method of applying it must be considered.

Discussing the relative merits of single helical gears, double helical gears of the hobbed type and of the continuous tooth type, Mr. Day stated that no one design can be said to be superior to both of the others for all installations. Single helical gears have advanced in prominence recently due for the most part to the commercial expansion of the thrust-resisting type of roller bearing, but in driving from one parallel shaft to another it is scarcely logical to deliberately introduce a thrust condition merely because it can be offset by a bearing, he pointed out.

Several outstanding cases were mentioned where single helical gears are preferred to the herringbone type, as follows: Rolling mill stands driven from tandem gears from a single motor; pinion stands for heavy duty rolling mills; and certain marine transmissions. In discussing bearings, Mr. Day, while granting that for many applications use of ball or roller bearings is indispensable, emphasized that the sleeve type still is a very efficient and durable bearing and that for certain large installations there is little to choose in the matter of efficiency between sleeve and antifriction types.

Some important advances in modern gear practice were attributed by the speaker to advent of new grades of lubricants, particularly the extreme pressure type. Most of these can be used for sleeve bearings, roller bearings and gear teeth, this resulting in simplifications of heavy gear design because it is now satisfactory to use one lubricant for gears and bearings without the necessity for separate systems.

Prefers Herringbone Gears

Mr. Sykes, in his paper, took a different viewpoint from that of the preceding speaker on the merits of the continuous tooth herringbone gear, stating that for at least 99.9 per cent of gear drives this type is superior to single helical gears and that in the remainder of cases it is desirable except on the basis of expediency. Listing 22 different advantages of the continuous herringbone gear, Mr. Sykes discussed the following claims which, he explained, may be disputed: No avoidable deflections and distortions; any known type of bearing can be used; stronger teeth; smoother action; more silent than any other type when made reasonably accurate; better lubrication due to the oil film formed by the wedge action of the teeth; cannot be produced by the hobbing process; large helical angles are used; and no oil trap at the center of the face.

Among other advantages not treated in detail were the fact that this type has a greater load carrying capacity because of the utilization of the full width of the face; that savings are effected in bearings due to the lack of necessity of extra heavy large size tapered roller bearings, and in gear and bearing housings owing to balanced thrusts; and that these gears can be produced with equal accuracy in any size demanded from ¼-inch diameter up to 20 feet, from ⅛-inch face up to 60 inches, from 24 diametrical pitch to ¾ and up to 4.188-inch circular pitch.

Features of the afternoon session, presided over by Howard Dingle, Cleveland Worm & Gear Co., Cleveland, included an address on "The Fallacy of Price Cutting as a Basis of Getting Sales," by P. W. Christensen, Cincinnati Gear Co., Cincinnati, and a discourse on the general business situation, entitled "Whither Bound?", by E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati. Reports of various standardization committees of the association also were heard, while a discussion of British gear standards as compared with those of the American Gear Manufacturers' association was presented by Prof. F. A. Mickle, University of Michigan, Ann Arbor, Mich.

Gear Production a Specialty

Casting and welding of steel were considered in two papers at the Tuesday morning session. In a paper on "Good Steel Foundry Practice in Gear Manufacture," Arthur Simonson, Falk Corp., described briefly the process of producing steel castings and urged gear manufacturers to specify blanks having a sufficient amount of finish so as not to jeopardize the production of perfect finished gears. He also pointed out that the making of gear blanks is somewhat of a specialty and that gear manufacturers would do well to patronize those foundries which have acquired their experience at great cost of years and money. "Welded Steel Construction" as applied to the gear industry was discussed in a paper by Thomas Holloway, United Enginering & Foundry Co., Pittsburgh.

An inspection trip to the plant of the Falk Corp. in Milwaukee Tuesday afternoon concluded the program.

For producing welds with high impact resistance, most designers now are specifying the use of coated electrodes. The atomic hydrogen method also produces welds having high impact values.

Design Factors for Water Systems

RELATIONS of velocities to pressure drop and heat loss as well as the suitable velocities for various services, expansion strains and water hammer, all have to be taken into consideration in the proper designing of water systems, according to W. H. Dopp Jr., Crane Co., Chicago, in an article in *The Valve World* for October, 1934, published by that company.

Each line is a unit in itself with a special function to perform.

The use of the proper metals of suitable thickness to provide at least a factor of safety of 5 and preferably a factor of 8 based on the tensile strength of the material. Metals of a reasonably well-known endurance or resistance to corrosion should be used.

Proper flexibility is necessary to insure against the building up of dangerous expansion and contraction strains.

Proper and adequate support and anchorage to safely carry the maximum possible load and to prevent and completely dampen vibration are required.

Properly selected pipe line joints are a matter of service requirements. No general rule can be laid down. It may be said, however, that the better the joint selected, the lower will be the maintenance.

Complete control is needed. Valves of the proper design, material and workmanship should be installed in the line at both ends and at all outlets. Ease of access and convenience for proper operation and inspection are essentials.

Provision for proper and complete drainage of the line at all times whether in service or not should be made.

AND NOW STREAMLINED TRUCK TANKS: A new 800-gallon, 4-compartment, gasoline truck, built by Farrell Mfg. Co., Joliet, Ill., for Sid Sears, Marengo, Ill. Designed for sleek, pleasing appearance, they also are built for maximum payload and proper load distribution as well as long life. The tanks proper are of No. 10 gage blue annealed sheets, for both shell and heads. The bucket box, skirting and sign boards are of No. 16 gage and the runways on both sides as well as the cat walk on top are of No. 12 gage rolled floor plate with raised pattern. The tanks were thoroughly sandblasted to remove all scale and rust, after which aluminum paint was applied

\$ \$ \$

Treated Beryllium Copper Resists Fatigue Stresses

Beryllium copper develops remarkable resistance to fatigue stresses in the heat treated condition, as shown by recent tests. One of these involved a vibrator arm of heat treated beryllium copper 1⅝ inches long, 0.013-inch thick, ⅜-inch wide at one end and 3/16-inch at the other. It was vibrated at a rate of 230 cycles per second, the full movement of the deflection being 1/16-inch. Each reversal involved a stress of 20,000 pounds. During the test the temperature was varied between 100 and 300 degrees Fahr. After 2,000,000,000 reversals, no signs of fracture due to fatigue were apparent.

By heat treatment the tensile strength of beryllium copper wire may be increased from about 74,000 pounds per square inch in the annealed condition to any desired value up to 181,000 pounds per square inch. Similar increases are achieved in hardness as well as in fatigue resistance.

\$ \$ \$

Opinions Differ as to Best Welding Process

Authoritative opinions have been expressed recently on whether welds made with bare wire by automatic alternating-current equipment are as good as those made with bare wire with direct-current equipment. One authority says that as good welds can be had by the former as by the

latter method whereas another holds that the quality of the welds made with bare electrodes by direct current is slightly better than those made with alternating current. A manufacturer of direct-current welding units comments to the effect that both these opinions may be correct, all depending on which type of direct current circuit is used as a basis of comparison.

\$ \$ \$

Supplies Tools To Erect Steel Highway Guard

A large manufacturer of steel highway guard rails is shipping with each consignment of guard-rail material, a complete set of five tools for use in assembling and erecting the parts. The policy of furnishing this set of tools is proving popular with road building authorities and contractors because of the extent to which it simplifies erection problems.

\$ \$ \$

Polished Metals Protected From Damage in Machining

To protect highly polished metals against damage in fabricating operations, the Apollo Metal Works, La-Salle, Ill. has developed a new protective covering marketed under the name Protex. In years past it was found that forming tools scratched and marred the surface reflectivity of nickel and chromium finished sheet metals. However, with development of the new coating, the company states, the precautionary measures formerly needed in working on such surfaces no longer are necessary. It is said that the use of Protex also makes it possible to make deeper draws, thus speeding production. The new compound is applied as a sheath which clings tenaciously to the metal during the forming operations but which is removed easily after the necessary machine operations have been performed.

This new protective coating is said to be of particular value in the manufecture of stamped parts for washing machines, ice cream cabinets, restaurant equipment and other metal goods in which a high surface finish is required.

\$ \$ \$

Corrosion Resistance of High-Cromium Iron

Reagent	Without Molybdenum	With Molybdenum
Aluminum mother liquor 40 degrees Cent. (slightly acid)	Varying	Absolutely reliable
Ammonium sulphate solution 69 degrees Cent. (with 5 per cent sulphuric acid)	Varying	Fairly reliable
Mixed acid 90 degrees Cent. (3 parts HNO_3, 3 parts H_2SO_4, balance H_2O)	Fairly reliable	Absolutely reliable
Monohydrate 80 degrees Cent.	Sufficiently reliable	Absolutely reliable
Phosphoric acid 45 per cent (boiling)	Sufficiently reliable	Absolutely reliable

High-Chromium Iron Developed Abroad

A RELATIVELY new development in Europe is that of Guronite, a high-chromium iron for castings, having excellent resistance to scaling and corrosion. The analysis is as follows: Carbon 0.7 to 2.3 per cent; chromium 30 to 35 per cent; silicon 10 to 20 per cent under the carbon content; molybdenum 2.5 to 3.5 per cent optional.

The molybdenum addition increases the strength of the material from 57,000 to 85,000 pounds per square inch at the same time refining the grain, and increasing the hardness and wear resistance.

The effect of molybdenum on the hardness at elevated temperatures is as follows:

Temp., deg. Cent.	Without molybdenum	With molybdenum
500	180	241
600	143	226
700	132	199
800	120	193
900	110	159
1000	95.4	153

The effect of molybdenum on the corrosion resistance of Guronite in several liquors is shown in the accompanying table.

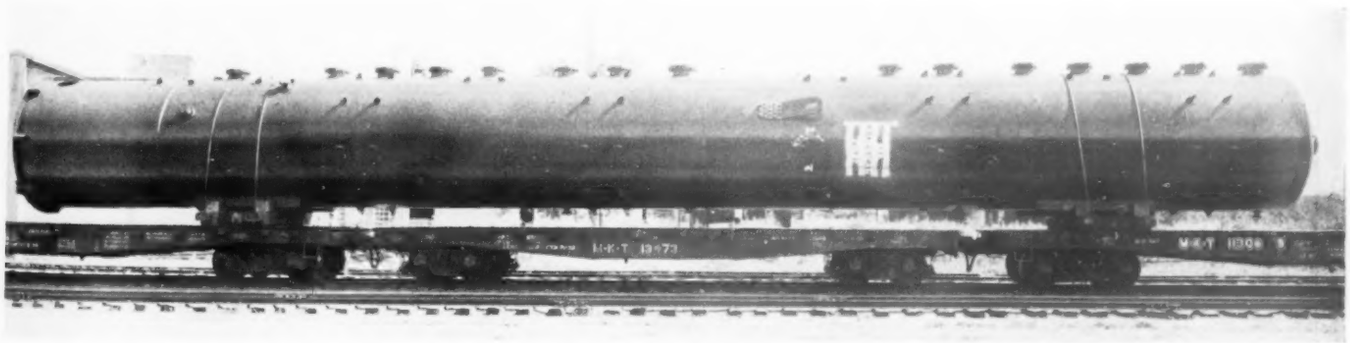
The relatively high carbon content of Guronite improves the casting properties, at the same time cutting the alloy cost by allowing the use of high-carbon ferrochrome.

The following are some of the uses to which the material is being put in Europe: Heat treating furnaces and chemical castings, pipes for chemical industry, pumps, fittings, valves, rolls for cellophane paper, cooking plates for electrical cookers, rabbles for roasting furnaces, and grates.

\$ \$ \$

Stainless Skimmer Disks

Stainless steel skimmer disks for use in cream separators have been developed by the International Harvester Co., Chicago, and were exhibited by the Allegheny Steel Co., Brackenridge, Pa., for the first time



THREE FLATCARS TO CARRY LARGE FRACTIONATING TOWER: One of the tallest in the mid-continent oil fields, improved type of fractionating tower has been installed by the El Dorado Refining Co., El Dorado, Kans. It is 96 feet high, 9½ feet in diameter and including 900-foot coil, 24 trays and 4400 caps, weighs approximately 102 tons. Walls of the tower are of ⅝-inch steel plate. To ship the tower cylinder, weighing 162,800 pounds, three regular-sized flat cars were required. From these cars it was unloaded onto a sledge and skidded into position. Two cantilever cranes swung it upright and eased it onto its solid concrete foundation where it was bolted in place. The entire job required a little more than 8 hours. The new fractionating tower, now being connected into the cracking plant, will increase the capacity of the cracking plant and also provide closer fractionating

at the Dairy Industries exposition held in Cleveland, Oct. 15-20.

S S S

Steel Display Rack Helps Sell Automobile Tires

A new tire holder which is being used for display purposes in connection with the retailing of automobile tires is made of steel. The base is made up of a circular rim with four arms that extend from the base of a central perpendicular rod approximately 4 feet high. Diameter of the base is slightly less than 3 feet. The base is mounted on castor wheels which are set at the outer end of each of the four arms. At the top of the upright rod is a curved sheet steel pocket for holding the tire. The entire assembly is of welded construction. The holder has capacity for nine tires.

S S S

Hard Surfacing Done With Tungsten Carbide Rods

Efforts to hard face rolled steel or cast surfaces with pure tungsten have not been entirely satisfactory because of the brittle coatings thus obtained. On the other hand, pulverized tungsten carbide in mechanical solution in mild steel electrodes forms a good hard wearing surface. Because of the difficulty of applying any finishing treatment to this coat after it has been deposited, however, its use is restricted mainly to such parts as oil drilling equipment and dipper bucket teeth in which rough finish is acceptable.

S S S

High Pressure Line Welding Procedure

N THE construction of a pipe line for operation with steam at a pressure of 650 pounds per square inch and a temperature of 850 degrees Fahr., a middle western public utility interest is using two types of welds; pipe to pipe and pipe to casting. The pipe used is 16-inch grade B, schedule 80 seamless steel pipe with the following analysis on the basis of percentage by weight: Carbon 0.33, manganese 0.75, silicon 0.06, aluminum 0.04 (metallic), chromium 0.06, phosphorus 0.01, and sulphur 0.02 per cent.

The casting used is a 16-inch ring of the same wall thickness as the pipe, and of the following analysis on the basis of percentage by weight: Carbon 0.24, manganese 0.62, silicon 0.36, chromium 0.82, nickel 1.19, and molybdenum 0.40 per cent.

The pieces to be welded are clamped in a jig in such a manner that the longitudinal axis is horizontal and approximately 4 feet above the floor. Thus the completion of the weld requires welding in the flat, vertical and overhead positions. Mild steel electrodes having an organic coating, are used.

Following the deposition of each bead of weld metal, the weld is cleaned with a chipping hammer and suitable chisels. This cleaning is done by a chipper assigned to the job as a helper. The practice of allowing the welder to chip his own weld is not tolerated for this class of work because of the danger of inducing arm fatigue and consequent unsteadiness of hand.

The welds are stress relieved by induction heating of a circumferential band containing the weld to a temperature of 1100 degrees Fahr., holding at that temperature for 1 hour and cooling in still air. The welds are examined by the X-ray method and by means of photomicrographs. They also are subjected to the usual physical tests, involving tensile, impact and other properties. In addition, creep tests are made on the original pipe and castings; the pipe, under a stress of 15,000 pounds reflected an elongation of 1.1 to 1.5 per cent per 100,000 hours. Temper-embrittlement tests were negative. The engineering department of the company doing this work believes that the resulting line will render satisfactory operating service.

STAIR TREAD ELIMINATES ACCIDENTS: Visitors at the plant of Gears & Forgins Inc., Cleveland, have remarked the ease and assurance with which they walk up or down a couple of flights of stairs between the office and factory. The stair treads are made of alundum aggregate, ceramically bonded aluminum oxide abrasive, securely bonded in a reinforced base of hard rubber. Since they were installed in this plant last spring, it is reported, no one has slipped, and therefore no accidents have occurred. The illustration shows one of the stairways, and one of the treads, as manufactured by the Norton Co., Worcester, Mass. The tread has a surface that is highly "non-slip," even at the very nosing edge. Its effectiveness is said to be permanent, as it cannot wear smooth. It is not effected by weather conditions, by water or other liquids. It can be placed directly over old or new wood, steel or concrete

S S S

Boiler Tube Tolerances Meet Brewery Demands

Recently a wrought iron pipe producer has found that by confining its rolling tolerances to those required for boiler tubes the resulting tubular product has found favor with certain distilling concerns for use in condensers. A prominent brewer recently equipped a shell and tube condenser with 2-inch No. 10-gage wrought iron tubes, the material having been drawn to boiler tube tolerances.

S S S

Pressure Vessels Welded Satisfactorily by A-C

Experience with the automatic alternating current welding process by an eastern manufacturer of Class 1 pressure vessels, is proving very satisfactory. Inspection over the past few months has shown an average defective welding lineage equivalent to 0.4 per cent. Inspection revealed that these defects uniformly were due to faulty preparation of the plate edges. All of these defective welds were removed, the joints properly prepared and new welds made.

A.S.M. Grain Size Symposium Records Recent Progress

STEEL herewith presents the second installment of its report on the grain size symposium conducted by the American Society for Metals during its annual convention in New York, Oct. 1-5. The first installment appeared in the issue of Oct. 22; the concluding installment will appear in an early issue.

CONSIDERABLE discussion ensued after B. F. Shepherd, manager, rock drill division, Ingersoll-Rand Co., Phillipsburg, N. J., presented a paper on the P-F characteristic of steel. Covering the same ground as a paper which the author presented before the Pennsylvania interchapter meeting of the A. S. M. in State College, Pa., last May —a paper which was abstracted in considerable length in the May 14 issue of STEEL, the current paper described a comparatively simple and accurate method for determining differences between various heats of steel of similar chemical analysis. This difference has been found to be a definite property and has been termed the "P-F characteristic," P referring to penetration and F to fracture.

By use of the test, heats of steel can be classified as definite types which have a definite relation to melting practice, ingot yield, hardening sensitivity and physical properties of the hardened part. The test has been confined principally to tool steels but the adaptability to carburizing and other types has been indicated. Results of the test are directly interpretable in terms of manufacturing practice.

Recommends Fracture Standards

During the development of the test a set of martensitic fracture standards was developed (see Figs. 4 and 5), and the author made an earnest recommendation that this set of standards be universally adopted to avoid the confusion which would necessarily arise from the development of standards in individual plants.

Praising the efforts of Mr. Shepherd in giving both the steelmaker and consumer another valuable and practical means for determining the inherent hardening, grain size and temperature sensitivity characteristics of steel, especially tool steels, R. Schempp, metallurgist, Halcomb Steel Co., Syracuse, N. Y., stated that early results of test work carried on in his company's laboratory indicates a very definite relationship between the austenite grain characteristics and the hardenability and P-F values as determined by the Shepherd methods. On tool steels, he said, Mr. Shepherd's testing procedure will allow definite classification of heats as to their specific types.

A. E. Focke, research metallurgist, Diamond Chain & Mfg. Co., Indianapolis, also commended the effort of the author to define or classify "body," "timber," and "personality," these being considerations of vital importance to users or manufacturers of heat treated steel articles. It appears significant, continued Mr. Focke, that the author admits the determination of the fracture part of his P-F test by visual comparison with a set of standards requires a high degree of personal skill. In his opinion, however, some test method which would permit a grain size analysis without use of an arbitrary set of standards would be preferable.

Hardenability Varies in Same Bar

H. G. Keshian, metallurgist, Chase Companies Inc., Waterbury, Conn., pointed out that from the same heat of steel not only the different bars but also different ends of the same bar may show considerable difference in hardenability, due mostly to degrees of segregation in the different ingots, and in the different ends of the same ingot. So, when considering the effect of a heat of steel from the standpoint of uniformity, some other tests such as hardenability, segregation, or macrostructure have to be applied to each bar to verify the uniformity of the various characteristics. This still leaves the steel mill practice as the best guarantee for the uniformity of hardenability, macrostructure, etc.

Adding his commendation to the work of Mr. Shepherd, F. H. Allison Jr., research metallurgist, Crucible Steel Co. of America, Pittsburgh, stated that for the reason that the P-F method is likely to become a standard procedure for an entire group of steel suppliers and consumers, it merits the most careful consideration and criticism that it may be applied as widely and fully as possible. Thereupon, Mr. Allison commented constructively upon several points. Among these comments was the following:

Clearer Terms Needed

"Concerning the designation of fracture, it is felt that the term 'grain size' should be avoided, since this term already has a significance in metallography which easily leads to confusion if adopted also in reference to fracture. The term 'fracture grain size' is little better since in discussion it is extremely easy to omit the word 'fracture.' It is suggested that 'fracture appearance,' 'fracture texture' or some better term be used for the sake of clarity in these references."

L. D. Hawkridge, Hawkridge Bros. Co., Boston, declared that in his opinion the P-F test will take its place beside the McQuaid-Ehn test as one of the indispensable tools of the industry. While the manufacturer or distributor of tool steel may deplore the advent of another test containing a large measure of the personal equation—which there undoubtedly is in the estimating of the F value—he must admit that by no other

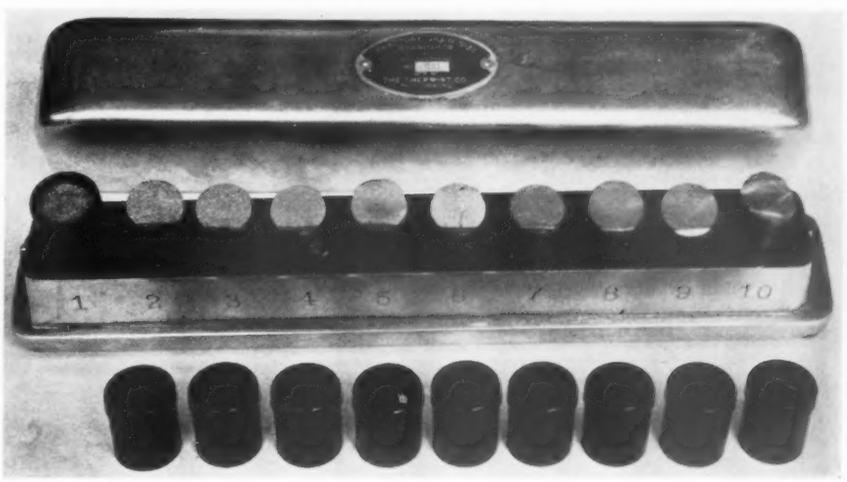


Fig. 4—Set of martensitic fracture grain standards developed by B. F. Shepherd for use in determining the P-F or penetration-fracture characteristic of steel. Protecting covers are removed from specimens 2 to 10

means known at present could so much or so exact information be packed into so little space as by the series of eight numerals proposed by Mr. Shepherd.

The author himself, continued Mr. Hawkridge, wisely stresses the difficulty of rating fractures correctly, and advocates special training of those who will act as observers. Mr. Shepherd might well have stressed also the fact that luster often tends to obscure grain size. It is a common error of beginners to rate a fiery fracture too far toward the coarse end of the scale. But in spite of the difficulties that one can foresee in the application of this test, it will be by no means more difficult to obtain agreement between buyer and seller than in other tests now widely used, for instance, the hot acid etch test.

P-F Ratings Recommended

G. V. Luerssen and O. V. Greene, metallurgical department, Carpenter Steel Co., Reading, Pa., observed that probably no physical characteristic of steel is more actively discussed and less accurately reported than the fracture test. They expressed indebtedness to Mr. Shepherd for establishing standards for the evaluation of a very useful test. The balance of their discussion dealt in detail with phenomena reported in the author's paper.

The comment of A. H. d'Arcambal, consulting metallurgist, Pratt & Whitney Co., Hartford, Conn., was that Mr. Shepherd had again definitely shown that steels of the same chemical composition when subjected to similar hardening treatments react differently, certain steels hardening much deeper than others, a coarser grained fracture also being noted on some of the types tested. He said it will be interesting to note the reaction of tool steel manufacturers and users to the author's suggestion relative to purchasing tool steels on the penetration-fracture basis as outlined.

S. C. Spalding, metallurgist, American Brass Co., Waterbury, Conn., stated that the general adoption of the P-F method of classification should help materially to bring up the average quality of carbon tool steels. It would seem a great forward step to be able to purchase steel to a certain range of P-F characteristics, rather than to a brand name. Mr. Spalding recommended that the A.S.M., either alone or in conjunction with the A.S.T.M., make a study of this method with the idea of working out acceptable standards for inclusions in specifications for tool steels.

IN A PAPER which he contributed to the grain size symposium, H. W. McQuaid, Research metallurgist, Republic Steel Corp., Massillon, O., dealt with the importance of grain size control in automotive steels. This paper touched on the importance of grain size characteristics, not only as shown by the McQuaid-Ehn test, but rather other conditions as well. It discussed briefly the uncertainty of such terms as hardness, toughness, etc., as well as the underlying factors which operate to cause grain size variation.

Mr. McQuaid gave results of grain size variation on case strength, impact value, distortion, etc., and emphasized the value of fine grain steels in making possible direct quenching of carburizing steels. He also discussed the application of the grain size specification to various heat treated parts and made pertinent recommendations (see Table I).

In conclusion, Mr. McQuaid warned against the tendency to use grain size effects and steelmaking variation as a scape goat for all variations in heat treatment or machinability. The fact remains that uniform conditions in heat treating and processing a lot of steel are just as important as ever, and when difficulties arise, a check-up of the heat treatment department and other related processes is just as much in order as it was before the advent of the McQuaid-Ehn test.

DIFFERENT characteristics and properties of grain size controlled steels was the subject of a paper by Philip Schane Jr., Carnegie Steel Co., Pittsburgh. The author devoted his attention mostly to S.A.E. 1040 forging steels and presented data to illustrate the widely different characteristics and properties of steels of inherently coarse and fine grain types (see Table II). The influence of mixed grain on the physical properties and the desirability of a uniform structure at the heat treating temperatures, which can be obtained only by a control of grain size in steel manufacture, was demonstrated clearly.

Summarizing, Mr. Schane said that with the control of grain size and composition the steel manufacturer

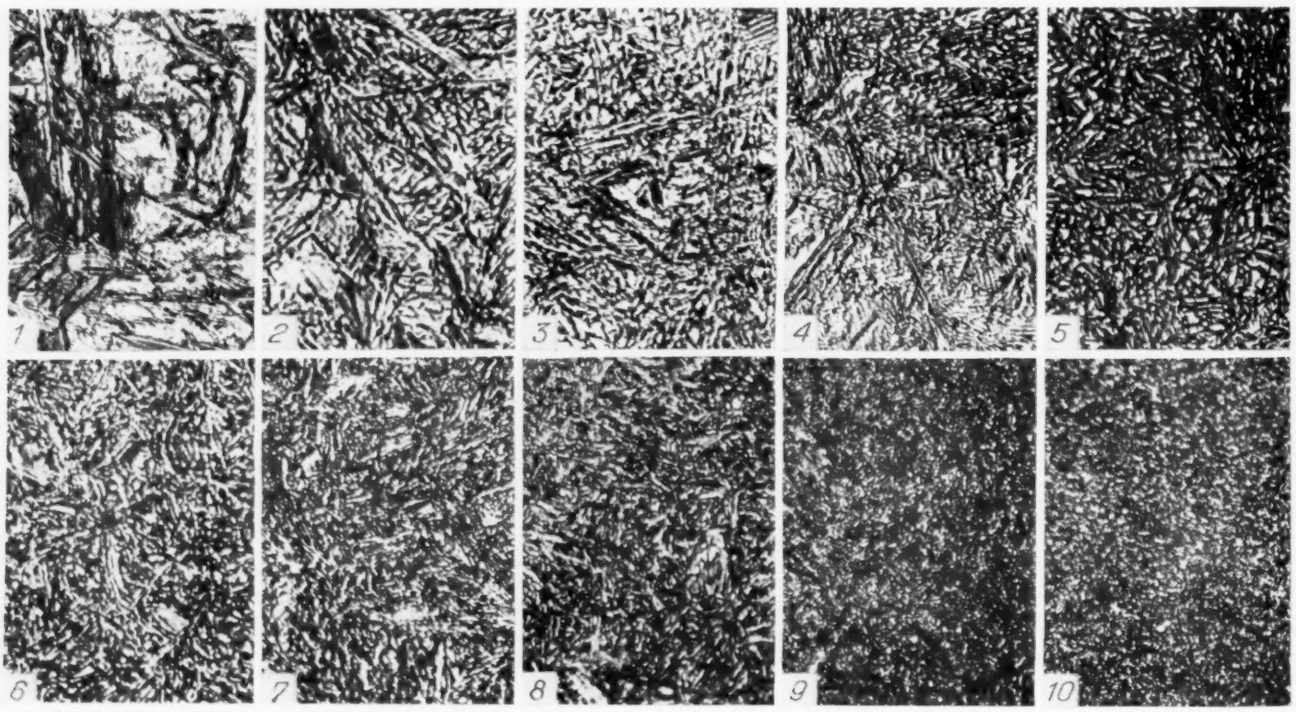


Fig. 5—Photomicrographs of the structures of fracture grain standards shown in Fig. 4

has at hand a means of meeting the specific requirements of almost any particular tool or part and can control the depth of hardness penetration within limits that would be impossible otherwise. If the most suitable steel is once developed for a particular application, a proof test can be devised which will insure future shipments of steel fully meeting the requirements, without the uncertainty that formerly existed when only composition and other less comprehensive standards were used to determine the suitability of the material. The details necessary for the manufacture of the steel are known and their control eliminates uncertainties in the steelmaking process and makes possible the desired uniformity of product.

INFLUENCE of grain size on the high temperature characteristics of ferrous and nonferrous alloys provided the topic for a paper by A. E. White, director of engineering research, and C. L. Clark, research engineer, University of Michigan, Ann Arbor, Mich. Their paper gave results which show the influence of both McQuaid-Ehn (inherent) grain size and the grain size as produced through heat treatment (actual).

For the inherent grain size studies two ferrous alloys were used, one of which contained 0.50 per cent molybdenum and the other 0.25 per cent molybdenum and 1.25 per cent manganese. For the actual grain size investigations two nonferrous alloys of the copper-zinc-tin type were used which differed in the amounts of copper and zinc which they contained.

The influence of inherent grain size was determined by tensile and Charpy impact tests at both room and elevated temperatures and by creep tests at 800, 1000 and 1200 degrees Fahr. Results were given also from tests conducted on the completed creep specimens for the purpose of determining the structural stability of these alloys under the given test conditions. Tests on the nonferrous alloys were limited to tensile tests at room and elevated temperatures and to creep tests at temperatures of 300 to 600 degrees Fahr.

Effects of Grain Size

On the basis of their tests, the authors concluded that actual grain size, that is, grain size produced through heat treatment, does have an influence on the resulting high temperature characteristics. Insofar as the tensile properties are concerned, it is observed that the fine-grained material possesses the greater strength properties over the entire temperature range considered. The influence of grain size on the ductility is not as uniform, but, in general, the coarse-grained material tends to give the greater elongation values, especially at the lower temperatures, while the fine-grained material gives, in the majority of cases, the greater reduction of area values.

The results from the creep tests indicate that at temperatures below the lowest temperature of recrystallization fine-grained materials possess the greater creep resistance, while at temperatures above the coarse-grained material has the greater resistance to creep.

Results which have been considered should give an indication at least of the relative influence of grain size as determined by the McQuaid-Ehn test (inherent) and that produced through heat treatment (actual) on the resulting high temperature characteristics.

Results of Creep Study

First considering the creep characteristics, it is observed that regardless of which type of grain size is being considered—actual or inherent—the maximum creep resistance at the lower temperatures is obtained with fine-grained materials, while at the higher temperatures a coarse-

Table I

Commonly Used Automotive Steels and Usual McQuaid-Ehn Grain Size Requirements

Steel	Grain Size Recommended
(a) Plain carbon not heat treated parts S.A.E. 1112 S.A.E. 1010 S.A.E. 1020, etc. S.A.E. X-1315	Coarse for maximum machinability and best cold heading properties. Fine when subjected to shock loads or occasional severe over-stress.
(b) Plain carbon heat treated uncarburized parts S.A.E. 1025 S.A.E. 1040 S.A.E. 1050, etc. Ford EE, EEE, etc.	Generally fine-grained, shallow-hardening type. When oil-hardened to high brinell use coarse grain type. Coarse grain in very heavy parts such as large truck front axles. Medium grain in passenger car front axles.
(c) Plain carbon case hardening type S.A.E. 1010 S.A.E. 1020 S.A.E. X-1315	Fine grain for minimum distortion. Coarse for machining and hardening. Generally recommended fine as possible consistent with satisfactory surface hardness. Used in camshafts, small gears, some differential parts, brake parts, washers, etc.
(d) Plain carbon high carbon type S.A.E. 1060 S.A.E. 1095, etc.	Flat springs, valve springs, coil springs. Fine grain best to avoid stress concentration. Bumper bar stock medium grain size to coarse for oil hardening.
(e) Plain carbon, high manganese with or without high sulphur S.A.E. 1340 S.A.E. 1360, etc.	Used in many important parts. Fine grain preferred. Depends on analysis, quench, etc. Not commonly specified.
(f) Low carbon, low alloy case hardening steels S.A.E. 2015 S.A.E. 2115, etc. Chromium-nickel Vanadium-gear steel C.N.V.	Fine grain for gears—Danger of trouble with surface soft spots if too fine and abnormal. For heavy parts, coarse grain. For direct quenching, fine grain preferred.
(g) Low carbon medium alloy types S.A.E. 3115 S.A.E. 6115 S.A.E. 4615 S.A.E. 2315, etc. Carburizing grade	For gears and bearings, fine grained best. Fine grain for direct quench. Coarse grain for heavy sections for maximum core properties. For maximum machinability with increased distortion coarse grain preferred unless special normalized.
(h) Low carbon, high alloy type. Case hardening 3½ per cent nickel-molybdenum S.A.E. 2512 S.A.E. 3300 S.A.E. 3400 Krupp, etc.	Used for truck and bus gears and very heavy duty case hardened parts. Fine grain in all applications.
(i) Medium carbon, medium alloy S.A.E. 3130-3140 S.A.E. 4130-4140 S.A.E. 5130-5140-5150 S.A.E. 6130-6140-6150	Used for passenger car and light truck axle shafts, arms, knuckles, some connecting rods, cranks, oil-hardened gears, etc. Should be fine-grained in all applications where so-called toughness is important. In heavy sections where deep quench is required medium or coarse grain is best.
(j) Medium carbon, high alloy steel S.A.E. 3240 S.A.E. 3330-3340 S.A.E. 3335 S.A.E. 3440 Cr-Ni-Molybdenum, etc.	Used for heavy duty gears, axle shafts, highly stressed parts. Always fine grain when used for above parts.

grained alloy is required for the greater creep resistance. In the case of the nonferrous alloys (actual grain size), this dividing temperature has been related to the lowest temperatures of recrystallization or equi-cohesive temperature. While no information is available concerning the lowest temperature of recrystallization of the two ferrous alloys (inherent grain size), it is believed that this would again be the dividing temperature.

Effects on Tensile Vary

Both types of grain size, continued Messrs. White and Clark, do not exert the same influence on the tensile properties at either room or elevated temperatures. In the case of the nonferrous alloys (actual grain size), it was found that the maximum strength and minimum elongation values were, in general, possessed by the fine-grained structures. On the basis of inherent grain size, however, the maximum strength characteristics were, in general, possessed by the coarse-grained steels. There were certain exceptions to this, especially in connection with the yield stress and proportional limit values of the molybdenum steel at temperatures below 800 to 900 degrees Fahr. The influence of inherent grain size on ductility was also different than that of actual grain size. With both of the ferrous alloys considered, the fine-grained steels gave the maximum values at temperatures up to 800 to 1000 degrees Fahr., while the coarse-grained steels were superior at the more elevated temperatures.

It appears, therefore, that on the basis of these tests, at least, both types of grain size exert the same influence on the creep characteristics, but that their effect is different on the tensile properties at either room or elevated temperatures.

In this connection, the authors said it should be noted that at least insofar as steels are concerned, the inherent and actual grain size are to some extent related. The actual grain size that is manifested in the structure usually depends upon the inherent grain size. For instance, if a coarse-grained and fine-grained steel are given an identical normalizing, annealing or quenching treatment, the difference in the actual structural grain size of the steel is traced to the difference in inherent grain size. In other words, the inherent grain size does not depend upon the actual grain size, but the actual grain size may be a consequence of the inherent grain size.

While the coarse-grained steels possess the superior creep characteristics at the more elevated temperatures, the difference between the fine and coarse-grained steels often is not sufficiently large to be of great commercial importance. In such cases greater emphasis should be placed perhaps on the other mechanical properties which grain size is known to influence.

More on Creep Values

Commenting upon the paper of Dr. White and Mr. Clark, H. D. Newell, chief metallurgist, Babcock & Wilcox Tube Co., Beaver Falls, Pa., stated it was his interpretation of their work that in the case of pearlitic steels the slight advantage in strength characteristics shown for the coarse-grained steels is partly offset by the slightly lower impact values and ductility of the large-grained steels, up to about 1000 degrees Fahr. On the basis of creep, the coarse-grained steels are preferable. In the cases of the nonferrous alloys tested, the fine-grained alloys possess the greater strength characteristics but the coarse-grained ones exhibit greater elongation values.

In working with chromium-nickel austenitic steels which are structurally similar to the alpha brass alloy 77-22-1, Mr. Newell found exactly the reverse to be true for elongation values when testing at higher temperatures than covered by the authors. In this case, fine-grained, low-carbon 18-8 showed both greater short-time strength and much better ductility than coarse-grained alloy of exactly identical composition.

As to the creep of 18-8, Mr. Newell pointed out that the recent work of the joint research committee indicates somewhat superior values for fine-grained rolled alloy with much greater total elongation before fracture (high-carbon alloy) when compared with large-grained cast alloy of identical composition. It may then be considered preferable, in the case of 18-8 alloys, to specify fine-grained metal for high temperature uses so as to obtain greater rel'ability.

However, concluded Mr. Newell, it seems evident that the structural characteristics, preciptation phenomena and other properties of each composition of steel or alloy must be known before the optimum grain size can be chosen for elevated temperature service as no general rule will likely apply to all materials through all temperature ranges.

Measurement of Grain Growth

A. J. Herzig, Climax Molybdenum Co., Detroit, said the statement made by Dr. White and Mr. Clark that "inherent and actual grain sizes are related" should be discussed further in connection with their high temperature problems. We shall eventually realize, he stated, that the McQuaid-Ehn test is of value only insofar as it gives some measure of the grain growth characteristic of the metal. These characteristics are present by virtue of the composition and manufacturing practice and cannot be readily nor accurately predicted on the basis of chemical tests now in use. The grain growth characteristics, in turn, give some notion as to whether or not we will be dealing more particularly with intra or intergranular forces and energy.

In relation to high temperature studies, Mr. Herzig said he would like to conclude that inherent grain size has a secondary relation to creep strength through its primary rela-

(Please turn to Page 43)

Table II

Comparative Physical Properties of Coarse and Fine Grained S. A. E. 1040 Steel

Standard Test Specimens Cut from Center of 1-Inch Rounds Normalized for 1 Hour at Temperatures Indicated

Normalizing temperature, degrees Fahr.	Grain Size	Yield Point, pounds per Sq. In.	Yield Strength, pounds per Sq. In.	Tensile Strength, pounds per Sq. In.	Elongation in 2 inches, per cent	Reduction of Area, per cent	Izod Impact, Ft.-Lbs.
1400	Coarse	51,220	53,000	95,970	26.0	52.2	28
	Fine	56,940	55,000	87,770	30.0	59.3	69
1500	Coarse	58,680	56,000	96,970	23.5	48.0	27
	Fine	57,190	54,000	88,760	29.0	58.0	56
1600	Coarse	55,000	52,000	99,000	22.0	45.0	15
	Fine	58,000	52,000	89,000	28.0	57.0	55
1700	Coarse	50,720	53,000	101,700	21.5	43.6	13
	Fine	58,680	54,000	88,760	27.5	56.2	55
1800	Coarse	50,720	52,000	103,100	20.0	40.6	9
	Fine	54 150	54,000	89,000	27.0	52.7	48
1900	Coarse	50,720	52,000	102,700	20.0	39.4	9
	Fine	50,200	52,000	94,480	24.0	48.5	31
2000	Coarse	51,420	53,000	102,100	20.0	39.7	6
	Fine	47,140	50,000	93,980	25.0	49.4	50

A part of the finished dormitory project, housing 200 students, at Stanford university, Palo Alto, Calif.

Prefabricated Welded Frame Panels Used in Dormitory

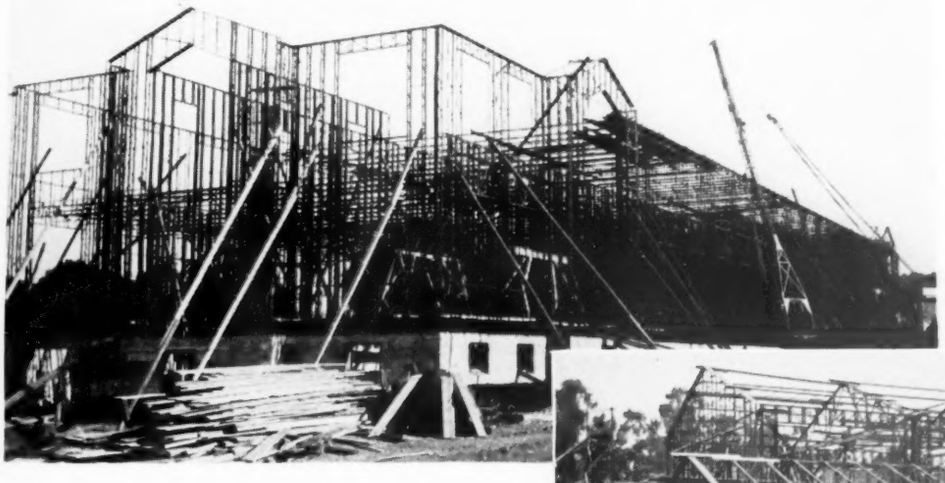
BY PHILIP I. BAKER, C. E.
Soule Steel Co., San Francisco

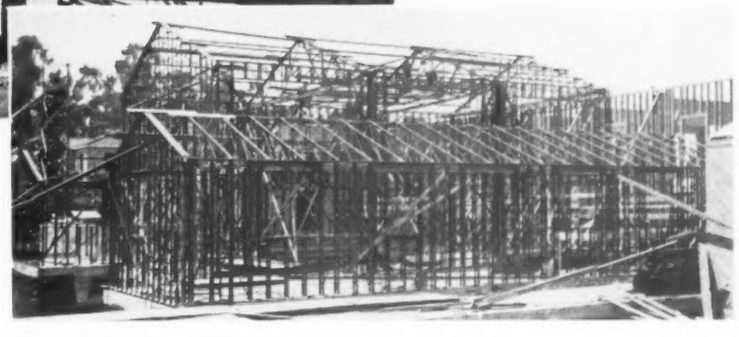
BASED upon the principles of fire safety, earthquake resistance, permanence and freedom from shrinkage, a large dormitory project recently has been completed at Stanford university, Palo Alto, Calif., reported to be the first construction of its kind erected on the Pacific coast. The project has occasioned unusual interest on the part of engineers and architects who see in the structures forerunners of a popular type of light steel construction for apartment houses and residences. Walls and floor systems all were fabricated from light hot-rolled steel members, and all connections, both in the shop and in the field, were are welded.

In this project are four two-story dormitories, 42 feet 6 inches wide; two of the buildings are 156 feet long and two are 209 feet long. In addition to these dormitories there are social halls, a large dining hall, help quarters and a large kitchen. The building, shown in an accompanying illustration, is known as Lagunita court, and is designed to house 200 women students enrolled for the 1934 fall term at the university.

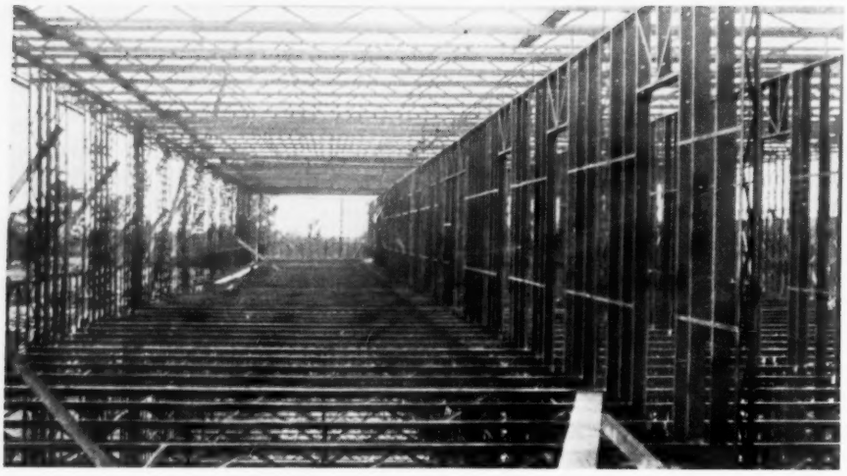
All exterior and interior corridor walls were made up in prefabricated panels. These panels were built in the plant of the Soule Steel Co., San Francisco, in sections approximately 10 feet 6 inches wide by two stories high. The exterior panels were 6 inches thick and the interior panels were 4 inches thick. In all cases provision was made for window, door and cabinet openings. The exterior panels consisted of latticed studs spaced 16 inches on center with a 6-inch light steel channel cap at the eave line and a ¼-inch plate at the bottom resting on the concrete foundations. These panels were secured to the concrete foundation by means of two ⅝-inch round bolts every 10 feet 6 inches and two ½-inch round bolts spaced between the ⅝-inch bolts at approximately 42 inches on center.

Latticed studs comprise two vertical members of special section spaced 6 inches apart out to out, with areas equivalent to that of a 1½ x 1½ x ⅛-inch angle. These vertical members were tied together by means of a ¾-inch continuous hot-rolled channel formed in the shape of truss diagonals and arc welded to the vertical members at each intersection. These





WALL frames have been erected in the view at the left and the steel truss floor joists are being placed in position. Below is the steel frame for the dormitory kitchen, erected and ready to receive metal lath on the interior and steeltex on exterior



Wall frames and steel truss floor joists completed and ready for lathing and flooring

studs are capable of sustaining a vertical load of 9250 pounds each.

Interior channels comprise 4-inch studs spaced 16 inches on center. All members except those at approximately 10 feet 6 inches centers were 4-inch solid channels. The studs at intervals of 10 feet 6 inches were the same as those for the exterior walls except that they were 4 inches wide instead of 6 inches. The latticed interior corridor studs, spaced 10 feet 6 inches apart, were set at intersections with transverse walls between each room and were made heavier in order to absorb the additional stresses carried to them by means of longitudinal and tranverse earthquake bracing.

The floor system comprises Soule Steel truss joists spaced 32 inches on center. The floor joists were bridged and made capable of sustaining all loads and resistance to shocks without any assistance from the finished floor construction. All joists were 12 inches deep and were made in one piece 42 feet and 6 inches long to extend the full width of the building. These joists were arc welded to the exterior wall studs and the interior corridor wall studs, thus producing a substantial and rigid frame. All steel joists were fabricated from angle members in accordance with the manufacturer's standard practice. On top of the steel joists was placed the finished floor construction consisting of 2 x 4-inch sleepers at 16 inches on center, supporting a subfloor and hardwood finish floor. The ceilings are made up of a special Bar-X steel lath, attached directly to the bottom chord of the joists, and plaster.

Design of the steel frame meets all requirements of the California state law for earthquake construction, and has been designed to withstand shocks equal in intensity to 10 per cent gravity. All connections were made with sufficient weld to develop fully all calculated and anticipated stresses in the various members connected.

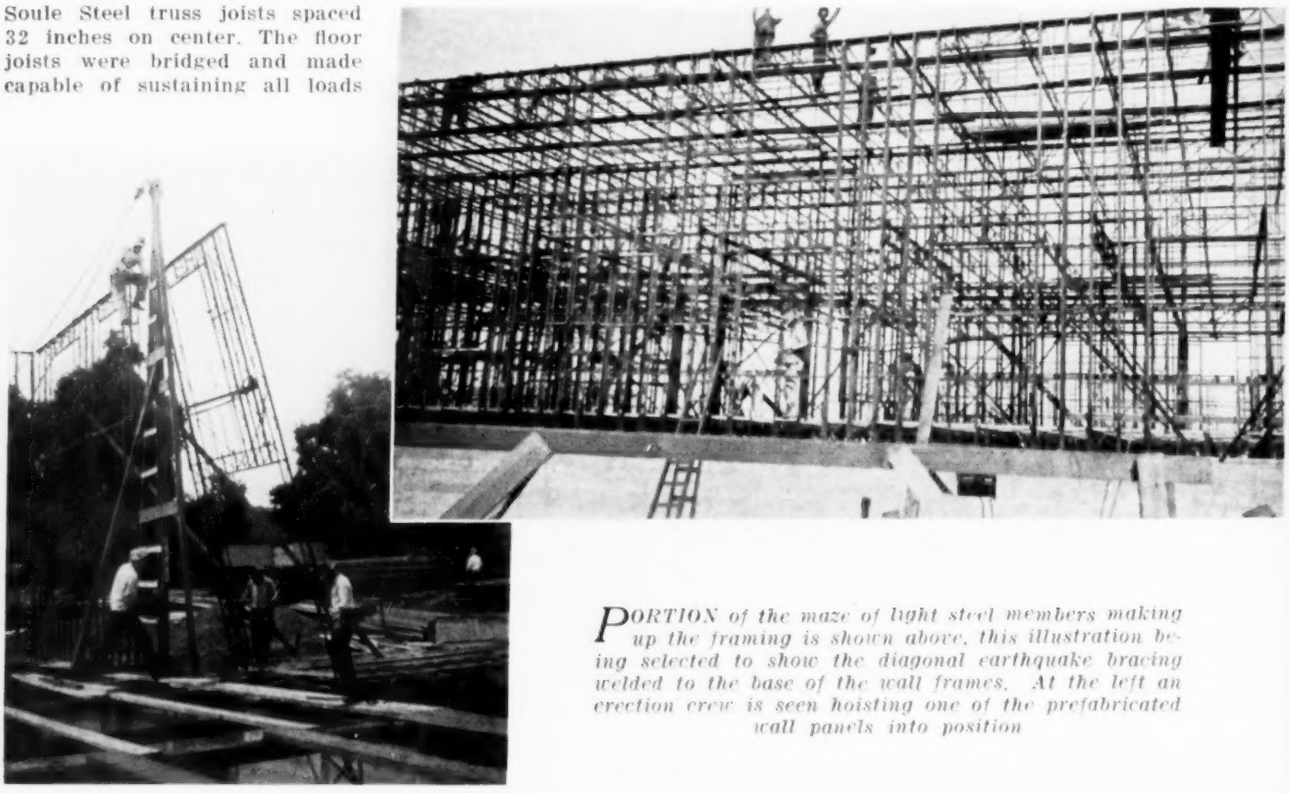
The outside finish of the building consisted of waterproof, paper-back steeltex base and stucco. The base was wired to the steel frame in accordance with recommendations of the manufacturers. On all interior wall surfaces the plaster is applied on the steel lath, which in turn is wired to the steel studs.

In this type of construction are seen many advantages, some of which are as follows:

(1) The fire hazard is minimized, and it is therefore possible to obtain a lower fire insurance rate than possible with a frame composed of combustible material.

(2) This type of construction is adaptable admirably to earthquake resisance, and is designed to resist definite external stresses. It has a certain amount of flexibility, and thereby prevents ruptures due to sudden violent disturbances.

(3) Termites, which are becoming an increasing hazard in many parts of the North American continent, cannot attack members of the steel frame. Thus, this hazard is entirely elimi-



PORTION of the maze of light steel members making up the framing is shown above, this illustration being selected to show the diagonal earthquake bracing welded to the base of the wall frames. At the left an erection crew is seen hoisting one of the prefabricated wall panels into position

nated from the structural portion of the building.

(4) Shrinkage, one of the worst problems to the architect, builder and owner, is entirely eliminated from the steel frame construction.

(5) Adequate space is provided for the installation of conduits and plumbing through the open web system of both the wall studs and floor joists. This greatly reduces the cost of wiring and plumbing and provides an easily acceptable space for making quick and economical changes in the wiring and plumbing systems at future dates.

(6) The time of erection is greatly reduced, since wall panels and joists are fabricated in the shop during the time required for completing the foundation work. These units are ready for immediate erection upon arrival at the job.

A signal feature of this project was the short time required for the erection of the four dormitory steel frame units. The erection of the framing and floor joists was started May 1 and completed June 15. The general contractor was able to begin laying the floor system in the fourth building May 29.

Architectural plans were prepared by Messrs. John Bakewell and Arthur Brown Jr. associated architects of San Francisco. All structural details were checked by Professors J. B. Wells and A. S. Niles of the Stanford university school of engineering. Fabrication and erection of the steel frame was carried out by the Soule Steel Co.

Welding Unit Joins Forgings at Both Ends of Housing Simultaneously

A DUPLEX seam welder that joins a forging to each end of a tubular shock absorber housing has been developed by the Thompson-Gibb Electric Welding Co., Lynn, Mass. It welds both ends at the same time and each of the two units that make up the complete welder make two welds in series. Actually, the machine makes four seam welds simultaneously so that the housing is rotated only one-half revolution to complete the work.

The machine is equipped with special work holding and aligning fixtures to assure accuracy and a special quick-acting tail stock speeds up handling of the work.

The welding wheels are driven by knurl or friction drives which keep the speed constant regardless of wear. Both the work and the welding wheels are cooled by an efficient flood cooling system. Both units of the machine are operated by a single variable speed motor and are powered by 100 kilovolt ampere transformers.

Seek Method To Determine Gases in Alloy Steels

The applicability of the vacuum fusion method for the determination of oxygen, nitrogen and hydrogen in metals, has been established for plain carbon steels but not, as yet, for alloy steels which are so important in modern metallurgy. The difficulty in the field of alloy steels has resulted from the lack of reliable auxiliary method of analysis to confirm the results obtained by the vacuum fusion method.

It is believed, however, that two methods, neither of which is satisfactory alone, can be combined to yield satisfactory results for certain types of alloy steels. If this belief is confirmed by the experimental work now being initiated at the national bureau of standards, Washington, the applicability of the vacuum fusion methods to alloy steels can be determined.

Studies Gas Combustion

"Research in the Effect of Operating Temperatures on the Combustion of Industrial Gas" is the title of a 39-page printed report issued by the committee on industrial gas research of the American Gas association. It contains the results of a study of combustion chamber wall temperatures made at the American Gas Association testing laboratory, 1032 East Sixty-second street, Cleveland.

Individual Motor Drives Serve Hot Strip Mill

(*Concluded from Page 27*)

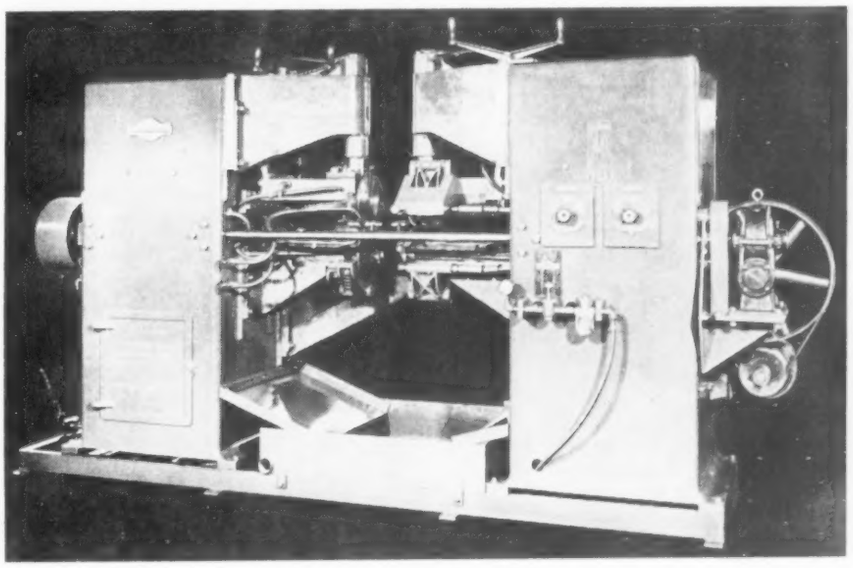
is used, such time would be approximately 20 seconds. The strip has traveled by the time the roller stopped 666 feet, in most cases off the table and on to the floor. The strip under this condition is damaged beyond any use and usually is relegated to the open-hearth department to be remelted.

It was for such requirements in stopping that this direct-current braking was developed. Stopping time which is adjustable can be provided to meet practically any condition economically and safely.

Automatic Control Important

As can be seen from the foregoing a successfully applied motor-drive to the rollers and coilers is but part of this installation. Automatic control providing ample power during starting and running with suitable provisions for stopping is equally as large a job as the design of the motors themselves. Fig. 2 shows the units furnished for the two mills by the Reliance Electric & Engineering Co., Cleveland.

The adjustable-frequency source of power supply must be adequate for all conditions encountered. In the design of this power equipment suitable control is provided to permit the use of plant power for continued operation of the mill in case of emergency.



This new duplex seam welder joins a forging to each end of the tubular shock absorber housing in one operation

Section of the foundry exposition held in Philadelphia, Oct. 22-26, by the American Foundrymen's association. Non-operating and smaller equipment, foundry materials and alloys were displayed in this section

Foundrymen in Busy Week At Congress and Exposition

UNPARALLELED enthusiasm and interest were evidenced by the 3000 or more foundrymen in attendance last week at the fifth international foundry congress and thirty-eighth annual convention and exposition of the American Foundrymen's association, held in Convention hall, Philadelphia. Technical sessions, shop operation courses, round-table conferences, committee meetings and a large exhibition of foundry equipment all were centered in the hall, making the location a world center for foundrymen during the five days the affair was in progress. (see page 12 of this issue for a news report of the congress).

About 100 exhibitors participated in the exposition, which was divided into two sections, one containing smaller nonoperating displays of materials and products used in the foundry, the other devoted to the arger equipment, much of which was in operation. A survey of the exhibitors clearly indicated that a new interest has been awakened in the foundry industry and that it is on the 'eve of going ahead to new progress and prosperity.

Interest in Blasting Units

Developments in equipment for cleaning castings by blasting provided one of the most interesting features of the show. W. W. Sly Mfg. Co., Cleveland, operated its new revolving barrel-type blasting unit. Pangborn Corp. Hagerstown, Md., displayed for the first time its centrifugal blast cleaning machine. A third striking display of this equipment was that of the American Foundry Equipment Co., Mishawaka, Ind., which showed in operation its "wheelabrator" device, an airless abrasive cleaning machine in which the abrasive material is handled and thrown against the work mechanically by a revolving wheel.

The latter device has numerous applications in the steel industry, such as in cleaning, billets, bars, sheets, forgings and many other articles. Wean Engineering Co. Inc., Warren, O., incidentally, is handling certain sales rights on the wheelabrator in the steel industry.

Alloy Castings Featured

One of the most attractive exhibits was presented by the Carborundum Co., Niagara Falls, N. Y. The booth had a large revolving abrasive wheel about 10 feet in diameter in the background; in front of this the central feature was a miniature lighted model of Niagara Falls, in which changing night lighting effects were simulated. This model was flanked on both sides by a complete range of the company's products. Norton Co., Worcester, Mass., exhibited samples of boron carbide in the form of sandblast nozzles.

Many companies showed pig iron, including the Bethlehem Steel Co., Bethlehem, Pa., which showed samples of standard and silvery "mayari" pig, and a number of castings in which this type of iron was used. The material is a natural chromium-nickel pig iron and offers a simple, economical method of adding alloys to castings.

Alloys have come of age in the foundry industry, a fact readily appreciated after noting the number of companies active in this field and operating exhibits. Climax Molybdenum Co., New York, showed a 6-foot diameter cast-iron gear for a large nut forging machine, the gear weighing 1 ton and containing 0.60 per cent molybdenum and 0.50 per cent nickel, molybdenum serving to close the grain of the iron and increase strength without sacrificing machinability.

Electro Metallurgical Co., New York, showed various types of castings containing chromium, while metallic nickel and nickel alloys in various cast forms were featured by the International Nickel Co. Inc., New York. Vanadium Corp. of America, New York, displayed specimens of ferroalloys.

A number of furnaces were shown, including an indirect arc furnace of the laboratory type displayed by the Detroit Electric Furnace Co., Detroit, and working models of high-frequency induction melting and heating furnaces shown by the Ajax Electrothermic Corp., Trenton, N. J. The latter units heated small ½ x 2-inch steel billets and melted small amounts of various metals.

Goliath's Shoe Exhibited

The materials handling field was not neglected; Clark Tructractor Co., Battle Creek, Mich., showing several types of tractors equipped with pneumatic tires, and Harnischfeger Corp., Milwaukee, featuring crawling traction cranes, monorail tramrails, in addition to welding and cutting devices. Link-Belt Co., Chicago, showed conveyors, monorail and tramrail equipment. An application of a selective 5-speed pushbutton control for use with any type of crane or hoist was exhibited by Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

A new type of insulating cement, made from a base of mineral wool and with a heat transmission as low as 0.217 B.t.u. per square foot per hour, was displayed by George F. Pettinos Inc., Philadelphia. The material was developed by Leo Roffe, formerly with Bethlehem Steel Co., and now with the Pettinos organization. It is suitable for use on annealing furnaces, boilers, open-hearth furnaces and other heating units. No reinforcing material is required in laying up the cement and it is resistant to temperatures up to 2000 degrees Fahr.

One striking display noted was the "largest boot in the world," towering over the exhibit of the Safety First Shoe Co., Holliston, Mass. A size 129, it required 45 square feet of upper leather, 65 pounds of sole leather and weighed 285 pounds. No one was discovered at the show capable of wearing this relic of Goliath of Gath.

Linde Air Products Co., New York, showed its new cutting ma-

chine for straight-line and circle cutting and simple flame machining, capable of being operated with either one or two blowpipes.

This brief review hardly does justice to the many hundreds of other products and equipment offered for use in modern foundries, but at the same time does cover some of the highlights of the exhibition of interest to readers of STEEL.

Redirect Study to Pinhole Porosity in Castings

PAPERS presented at a session on steel founding Oct. 23, centered around one of the peculiar problems of steel foundry practice for which up to the present no definite solution has been discovered. The problem in its various manifestations turns up at every convention of the association and while many theories have been advanced, no positive solution has been discovered up to the present. In the present instance the entire session and the greater part of the discussion presented at the round-table meeting which followed the regular session were devoted to a consideration of that particular phase of porosity usually known as pinholes, that is, the small cavities close to the surface of otherwise sound castings.

Four papers were presented on the subject: "Preparation of Steel To Avoid Porosity in Castings," by C. E. Sims, American Steel Foundries, Chicago; "Relation of Molds and Cores to Porosity in Steel Castings," by George Batty, Steel Castings Development bureau, Philadelphia; "Function of the Steel Foundry Foreman in Preventing Porosity," by R. A. Bull, Chicago, and "The Mechanics of Porosity in Steel Castings," by R. C. Woodward, George H. Smith, Steel Casting Co., Milwaukee.

Possible Causes Number 25

Mr. Sims outlined three main sources of porosity—condition of the metal, of the mold material and construction of the mold. His paper covered only the metal feature. Gases in molten steel are carbon monoxide and carbon dioxide, present only as reaction products; hydrogen and nitrogen soluble as hydride and nitride. He explained the role played by equilibria and surface tension. In his opinion the porosity problem resolves itself into reducing dissolved gases as much as possible, and producing the condition most favorable for retaining in solid solution those gases which cannot be eliminated. These conditions may be secured by a long, vigorous boil and thorough deoxidation.

Mr. Batty pointed out that the defect may be traced to the sand or in certain instances the binders. He also stressed the necessity of providing free egress of the steam and gas from the sand. In this connection he instanced the efficacy of providing a squeeze board on squeezer type molding machine, provided with nails to artificially vent the upper layer of sand in the cope or drag. He also advocated vented flasks and bottom boards and touched upon the necessity of providing clean gates. In the ensuing discussion, he elaborated on the theory that displaced particles of sand are responsible for this particular type of porosity.

Mr. Bull's paper was confined to the practical rather than the scientific phases of the problem. He directed attention to conditions arising in the transfer from the furnace to the mold, and commented briefly on the use and effects of aluminum. In a practical and comprehensive manner, he listed 25 possible causes of porosity, which to some extent are controllable. He concluded by reference to the inter-relationship of possible causes for porosity and the delicate balance necessary to prevent this form of defect.

Rejections Records Studied

A rather novel theory was advanced by Mr. Woodward to account for porosity close to the surface of steel castings. He presented a study of rejections records over a period of six years. Microscopic examination of these castings revealed a relationship between nonmetallic inclusions near the surface and the amount of porosity. Records also showed that porosity was greater in summer than in winter. He concluded that the surface inclusions remain liquid longer than the enclosing envelope and the evolved gas is trapped.

At the round-table meeting which followed the regular meeting reports of committees dealing with proposed classifications of steel castings were submitted by C. H. Lorig, Battelle Memorial institute, Columbus, O., and W. C. Hamilton, American Steel Foundries, Chicago. R. A. Bull, Chicago, reported for the committee investigation the subject of phosphorus and sulphur in steel.

Presents Basic Ideas on Gating and Feeding

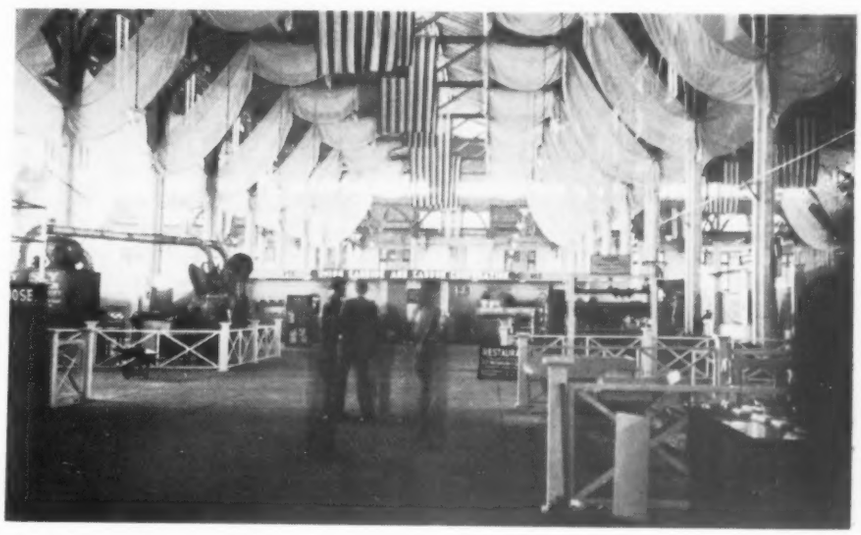
GEORGE BATTY, Steel Castings Development bureau, Philadelphia, at a session on steel founding Oct. 23, presented certain views on the subject of gating and feeding steel castings that were rather outside the experience of the average steel foundryman. He claimed the basic idea had been known and practiced by Harry Brearley in England nearly 40 years ago in the production of steel ingots.

The method was described by Mr. Batty as controlled directional solidification in which the essential feature is to provide the hottest metal at the upper part of the mold. This is provided by a manipulation of the gates and by changing the position of the mold after it has been filled with steel. In some instances the position of the mold is completely reversed.

Properties, Uses of High Chromium Cast Irons

CHROMIUM is used in many alloys for heat and corrosion resistance and is becoming well recognized for these applications. In a paper presented at a session of gray iron founding, Oct. 23, Garnet P. Phillips, metallurgist, Frank Foundries Corp., Moline, Ill., outlined the manufacture of high-chromium irons containing approximately 20 to 35 per cent chromium. These irons are made in the electric furnace.

They may be divided into two classes, one containing about 1 per cent carbon or less and the other more than 1 per cent. Thus it is



Another view in the foundry exposition, looking down the center aisle of exhibit hall No. 2

seen that the former class might almost be classed as a steel, except for the fact that it has high silicon content.

Melting, molding and pouring procedure were outlined and in this connection Mr. Phillips reported that he had used ferrochrome containing 0.7 to 0.8 per cent nitrogen with eminent success to produce finer-grained, low-carbon irons such as these, with good physical properties. Applications for the material include conveyor chain links in heat treating furnaces, lead pot grids, oil burner parts, furnace hearths, boiler hearth parts, exhaust manifolds, die casting machine nozzles, furnace trays, plates for receiving hot clinker for cement manufacture, lead pots, annealing boxes and ornamental castings.

Warpage Is Avoided

High-chromium irons have good resistance to atmospheric corrosion, and to nitric, sulphuric and mixtures of nitric and sulphuric acids. They have been found reliable for dilute phosphoric and lactic acids, for numerous salt solutions and for caustic soda solutions. In contact with molten lead and aluminum, they have given excellent service with practically no warpage.

Shortage of Skilled Labor Spurs Apprentice Training

AS INDUSTRY emerges from four years of depression, the need for new concentration upon the problem of training apprentices for skilled labor work becomes serious. This fact was forcibly emphasized as a result of an extensive survey of industries in the Philadelphia district, made by Kenneth Coolbaugh, Pennsylvania department of labor and industry, Philadelphia, and reported upon at a session on apprentice training at the A. F. A. convention, Oct. 23.

The significant fact developed by this survey appears to be that a distinct shortage of skilled workers in a number of lines is evident—notably machine operators, toolmakers, die-sinkers, machinists, and the like. When industrial conditions improve, as it seems they are bound to, this shortage will become acute and the logical approach to the impending difficulty lies in immediate institution of carefully designed programs of apprentice training.

The question naturally arises: Where have former skilled workers gone? Why the shortage now? Three factors bear on this question. Many workers have become fed up with their trade and switched to new fields; some have established businesses of their own; others have succumbed to old age and failing health. Reliable estimates indicate that there is a 5 per cent loss in skilled labor yearly from old age-poor health causes. Unless this loss is made up by newly trained men, which of course has not been done in recent years, a shortage is but natural. On top of this, current agitation in Washington is toward a further reduction in working hours, which can only aggravate the situation.

Mr. Coolbaugh pointed out that public employment agencies have lists of thousands of young men, eager to learn a trade, from which employers might select suitable applicants for apprentice training. He further stated that although vocation schools are doing good work, the best training can be had only by actual experience in the shop, combined with vocational training in schools.

Thus, briefly, is the need for apprentice training programs at the moment. Turning to reasons why this type of training has been receiving attention, W. F. Patterson, executive secretary, federal committee on apprentice training, Washington, pointed out three: First, immigration has been shut off, virtually locking out skilled labor from abroad; second, there has been practically a moratorium on apprentice training since 1929; and third, NRA codes, with their minimum wage provisions, have prevented apprentice training, although there are some exceptions to the latter inasmuch as 4.3 per cent of present codes have reasonable provisions for this work.

Have Apprentice Plan

The result has been a pressure on the government from many sources to facilitate establishment of plans for apprentice training. To satisfy these demands a permanent organization has been set up under direction of the secretary of labor. This organization involves a committee of three, which is now functioning to set up apprentice training programs in all 48 states, the work in each state to be under the direction of state committees of six or eight persons, carefully selected to represent employers, labor, government and educational bureaus. Regional conferences aiming to set up these state committees have been concluded and at present agencies have been established in ten states—Wisconsin, Michigan, Colorado, Wyoming, North Dakota, Ohio, Kentucky, Delaware, Maine and West Virginia.

Will Publish Journal of Applied Mechanics

American Society of Mechanical Engineers has decided to publish in four quarterly issues, beginning 1935, a *Journal of Applied Mechanics*. It will contain papers on applied mechanics which have been presented before the applied mechanics division of the society, besides other papers not so presented, reviews of pertinent literature and notes on important developments.

An editorial board will be appointed, consisting of specialists covering the different branches of the field of applied mechanics, including elasticity, plasticity, strength of materials, vibration, aerodynamics, thermodynamics, film lubrication and electromechanics. The journal will be sold to nonmembers at $5 per year.

A.S.M.T. Approves Alloy Steel Specifications

Upon recommendation of its committee A-1 on steel, the American Society for Testing Materials has accepted for publication as tenative specifications covering alloy steel castings for valves, flanges and fittings and seamless alloy steel pipe, the materials being for service at temperatures from 750 to 1100 Fahr. There have been urgent demands from industry for these specifications.

The specifications for alloy steel castings, designated A 157-34T, include eight classes of materials, six ferritic steels and two austenitic steels. The seamless alloy steel pipe specifications, A 158-34 T, cover eight ferritic and four austenitic steels. The specifications, which were drafted by subgroups headed by Prof. A. E. White, University of Michigan, and N. L. Mochel, Westinghouse Electric & Manufacturing Co., provide that information on high-temperature data is to be a matter of agreement between the purchaser and seller until such time as the committee's studies warrant the addition of an appendix giving data now being developed. Copies of the new tenative standards will be available shortly from A. S. T. M. headquarters.

Make Standards Agree

Tentative revisions have also been approved in the standard specifications for structural steel for ships, A 131-33, involving a reduction in maximum sulphur from 0.06 to 0.05, and a minimum elongation of 18 per cent in material for ¾ inch thickness. When these proposals are adopted as standard, the specifications will agree on these matters with the standards for bridge steel.

Revisions also have been accepted as tenative in the standards for carbon-steel castings, alloy-steel bolting material and pipe flanges, all for high-temperature service, providing additional data on the use of the materials in oil refinery service.

All of the above actions on standards were approved at the August meeting of committee E-10 on standards, at which 17 new specifications and tests were accepted for publication as tenative.

Selecting Suitable Material At Lowest Price Is Problem

IN HIS recent lecture, "Iron and Steel Today and Tomorrow," R. S. Archer, chief metallurgist, Republic Steel Corp., Chicago, declared that perhaps the most marked trend today might be defined as an intensive study of the application of iron and steel. While there are now a considerable variety of materials which will perform satisfactorily, the problem of the user is to select the materials which will fulfill the required functions at the lowest ultimate cost. Mr. Archer presented his lecture Oct. 5 before the iron and steel division of the American Society of Mechanical Engineers, at the National Metal congress in New York.

He asserted that there is in view no basically new process of steel manufacture which offers any substantial economies in the making of steel, but added that room for further economy lies in the operation of present methods, particularly in the direction of bringing these methods under closer control. He thought there was a decided opportunity for reductions through the intensive study of application of steel and of fabricating processes now taking place.

Discusses Progress Factors

Mr. Archer traced the growth of the iron and steel industry, and spoke particularly of the development of alloy steels and cast iron, of controlled properties in plain carbon steels, and improvement of heat treating processes and equipment. He cited many of the new uses of steel in recent years and looked for continued growth in consumption. Further expansion of the aircraft industry, the air-conditioning industry and undoubtedly other industries which he said are not yet visualized would make heavy demands.

Of the many postwar developments one of the most important in iron and steel, is that of the continuous hot rolling of wide strip and sheets, and Mr. Archer saw as the greatest single stimulus to this the rapidly growing demand of the automotive industry for body and fender stock. However, there were other important factors, particularly the use of wide strip in recent years for the manufacture of electrically welded pipe.

The manufacture of tubing and pipe by electrical welding processes has in itself been a major development.

Marked advancement has been made in the quality of sheets for vitreous enameling, and improvement in welding processes has played an important part in steel fabrication. The development of the heavily coated metal electrode has made possible the economical production of ductile welds in heavy stock. Superior weld rods have also been developed for gas welding, and the "shot" weld is proving particularly valuable for the joining of thin sheets of stainless steel. Welding processes are finding new applications, effecting new economies and opening up new possibilities for the fabrication of steel.

Mr. Archer discussed the advancement in wrought iron, speaking particularly of the commercial development of the Aston process. Recently, he said, considerable interest has been shown in alloy wrought iron, especially nickel wrought iron. There has been important progress in gray cast and malleable iron, and for general foundry work there has been a revival of interest in the lower carbon "high-test" irons.

Alloy gray irons have come in to rather extensive use. Nickel has been employed particularly to give greater uniformity of hardness in sections of varying thickness; chromium largely for wear resistance; and molybdenum for increased toughness, refinement and greater machinable hardness.

A development of particular interest in connection with iron castings, Mr. Archer pointed out, is that of ultrahard cutting tools. These tools permit the use of higher cutting speeds and the machining of harder castings. In the steel foundries, low alloy additions and heat treatment have been employed to an increasing extent for higher physical properties.

Radiography has become a practical method of inspection for metals, especially castings. Hardening of metals has become much better understood and is leading not only to a better foundation for certain fabricating and heat treating operations, but also to a clearer conception of the functions of alloys in steel.

Lower Stainless Prices Expected

Perhaps the most important metallurgical development of the postwar period is that of grain size control, and, discussing alloy steels, Mr. Archer noted a trend toward wider use of molybdenum. He also thought that leading developments in the high alloy steels had been in the field of corrosion and heat-resisting steels, containing high percentages of chromium, with and without high percentages of nickel.

Mr. Archer stated that a comparatively new field of application for stainless steel which promises to become highly important is that of light-weight construction, where it competes with the light metals, aluminum and magnesium.

The cost of stainless steel has been coming down as methods of manufacture have improved and he looked for a continued lowering of prices as larger markets are developed. He pointed to stainless-clad steel as offering special means of reducing cost for certain applications.

Grain Size Symposium Records Recent Progress

(*Concluded from Page* 36)

tion to actual grain size; this in accordance with our conviction that it has been definitely established that actual coarse grain and actual fine grain show the lowest creep rates above and below the equi-cohesive temperature respectively.

It was the opinion of Mr. Herzig the authors had quite firmly established in their paper their theory regarding the significance of intergranular cohesion in creep and that through their consideration of the effect of inherent grain size they have now essentially given a full explanation of the rudiments of creep. As an outgrowth this provides a new method of approach in searching for compositions suited to high-temperature service.

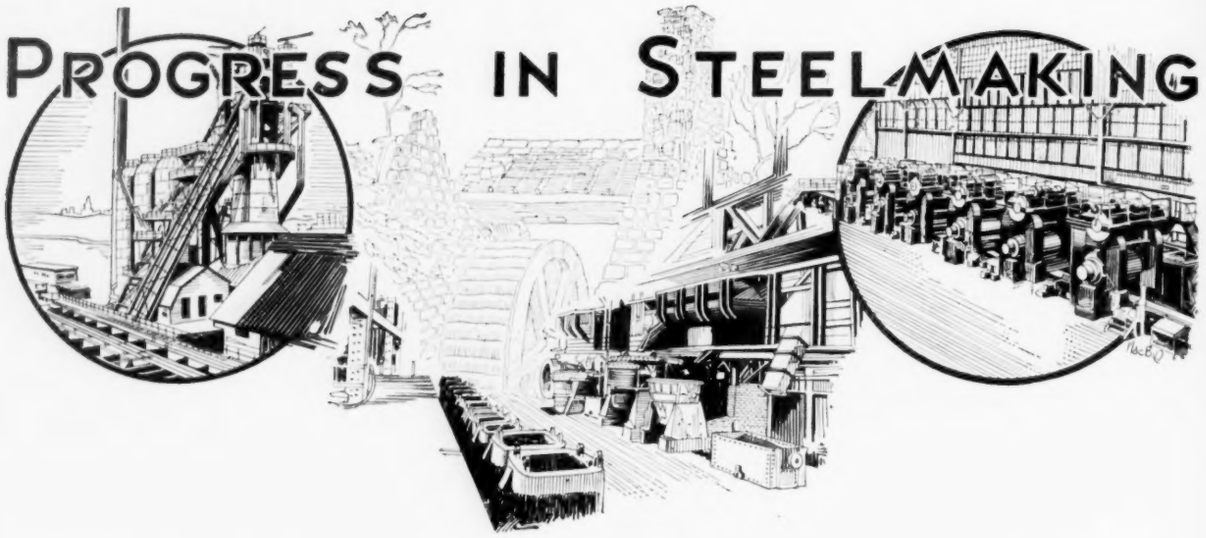
Grain Size in Quenched Steel

According to H. W. McQuaid, research metallurgist, Republic Steel Corp., Massillon, O., Messrs. White and Clark have shown with the steels tested that the coarse McQuaid-Ehn grain size indicates superior creep resisting and other properties at elevated temperatures. These steels tested were in a pearlitic condition and the structure obtained would correspond closely to that obtained by the McQuaid-Ehn carburizing test itself. The importance of the grain size is generally greater in the quenched condition than in the annealed condition, and it is to be regretted that samples were not tested which had been quenched and drawn to the highest temperature used in the tests.

Mr. McQuaid said he believed also that the effective grain size produced through heat treatment (actual) should have been studied by producing in the annealed condition and the heat treated condition different grain sizes for the same tests. Varying the initial heating temperatures for quenching and annealing would have produced a change in actual grain size which would have given to these tests greater value as far as the metallurgist interested in ferrous materials is concerned.

(*To be Concluded*)

PROGRESS IN STEELMAKING



AUTOMATIC fire extinguishing equipment installed to protect the coating rack in the varnishing department of a pipemaker in the Pittsburgh district has extinguished fires on two occasions without an insurance loss. A spark from a grinding operation ignited the oil in the pit, which immediately burst into flame and caused the automatic fire extinguishing equipment to go into action. The fire was blanketed and extinguished before most of the men in the department knew there had been a fire. There was no loss except one barrel of oil and two hours' time for cleaning up. Sometime later the curtain took fire and the automatic equipment again went into action and prevented the fire from getting out of the pit. The flaming pieces of curtain dropped into the foam covered pit and were extinguished. The equipment is carefully maintained in first rate condition and inspected monthly by the master mechanic under the direct supervision of the safety director.

♦ ♦ ♦

Records are kept by an Ohio producer of precision-finished steel bar sections of every melt to afford tracing every heat from the time it was tapped until it was consigned to the consumer and placed in transit. The records are reviewed constantly and assist the operating department in duplicating orders that have proved satisfactory particularly from the standpoint of the consistency of steel and uniformity of section.

♦ ♦ ♦

Acid requirements for two pickling tubs at a plant in the Chicago district are proportioned readily by a measuring tank located at the side of the cleaning vats and within close proximity. Acid from an 11,000-gallon storage tank flows by gravity, the quantity being predetermined by a sight gage. Any overflow is by-passed into one of the pickling tubs.

♦ ♦ ♦

Modern hot blast stoves are designed to consume a minimum quantity of gas for the maintenance of maximum temperatures. To effect this operation about 7 square feet of heating surface and 1.8 cubic feet of brick volume are required for each cubic foot of air blown per minute, according to a blast furnace superintendent.

♦ ♦ ♦

To facilitate the work of inspectors, chippers and grinders at the plant of an Ohio barmaker, a special lighting system has been installed. Uniform illumination over the entire working area in this department is maintained on the basis of 50 foot-candles.

♦ ♦ ♦

One of the most successful methods used to overcome shelly ingots is by the use of a deeper well at the bottom of the mold. However, this part of the ingot must be cropped and adds to the amount of scrap. The difficulty may be avoided largely by carefully tarring the interior of the mold, according to tests conducted abroad.

♦ ♦ ♦

Compressed air is employed by an Ohio producer of forgings for blowing scale out of small forging dies but when large forgings are scheduled steam is used for this purpose. The reason for this is that steam is more effective for removing the swabbing oil and scale which accumulates in the bottoms of the deep impression in the large dies.

♦ ♦ ♦

Three separate reading scales are incorporated in an optical pyrometer designed for determining the temperature of metal. One scale reads from 1400 to 2000 degrees Fahr., a second reads from 1800 to 3400 degrees Fahr., and a third ranges from 2200 to 3600 degrees Fahr., corrected for direct reading of spout and pouring temperatures.

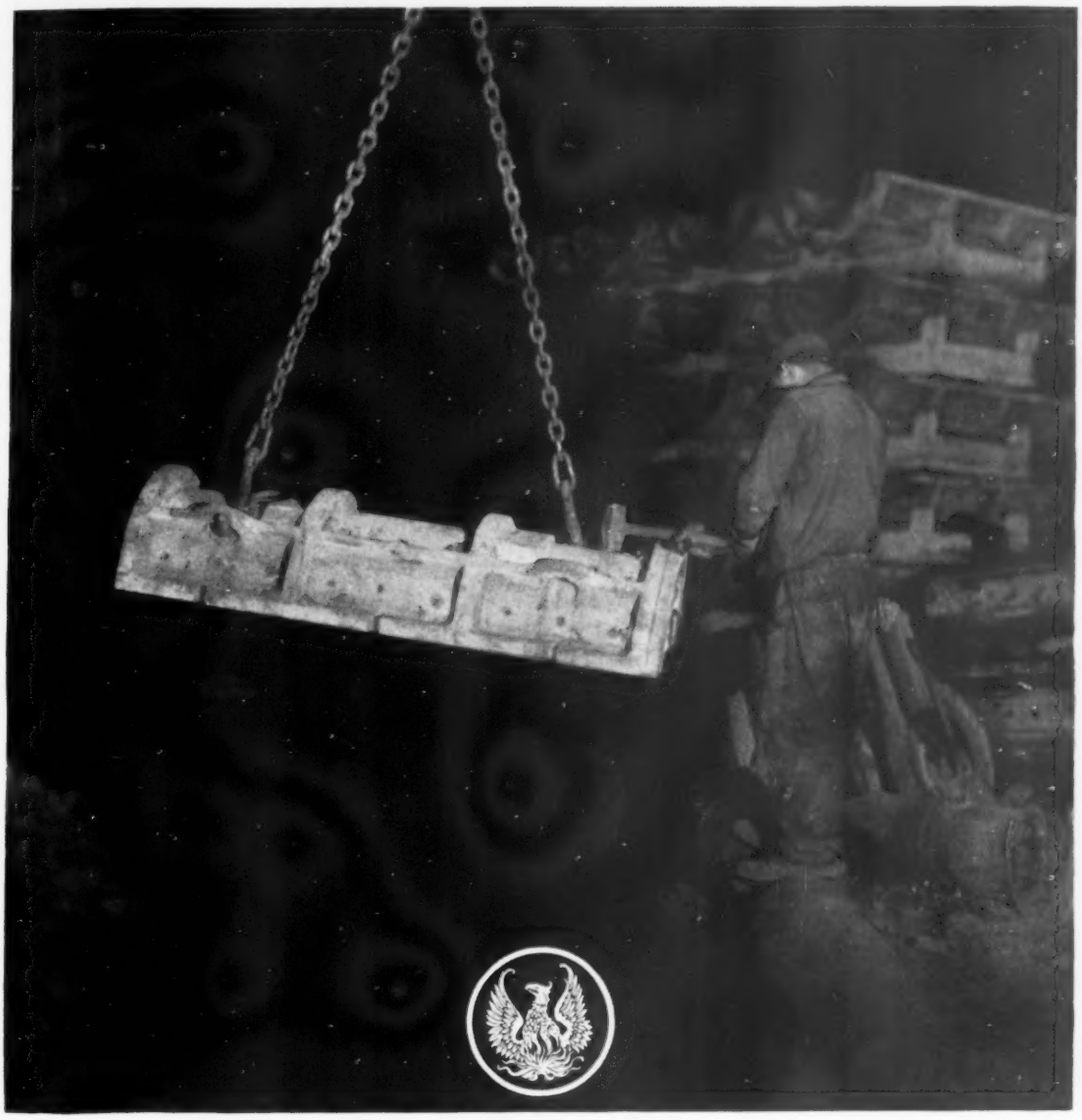
♦ ♦ ♦

Steel plates under 7 gage free from surface riffles are being produced by a simple method which consists of matching the top and bottom rolls and using machine-cut pinions.

♦ ♦ ♦

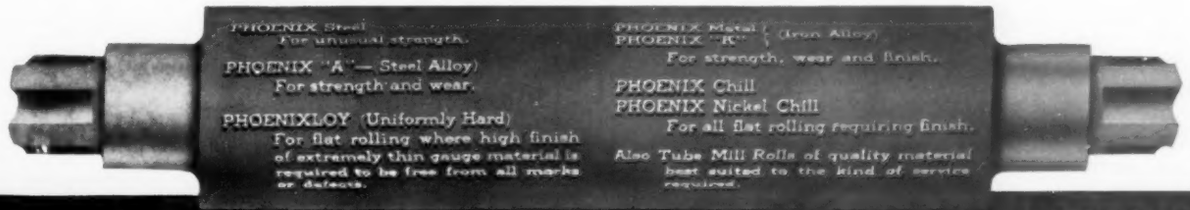
A thermocouple with a high thermoelectric power capable of recording temperatures up to 3800 degrees Fahr. soon is to be marketed. The couple has been inserted in molten iron coming from the blast furnace and for the entire cast, and in ladles of various grades of molten metal. The unit also has been employed for recording the temperature of open-hearth baths and checker chambers.

MODERN ROLL TECHNIQUE



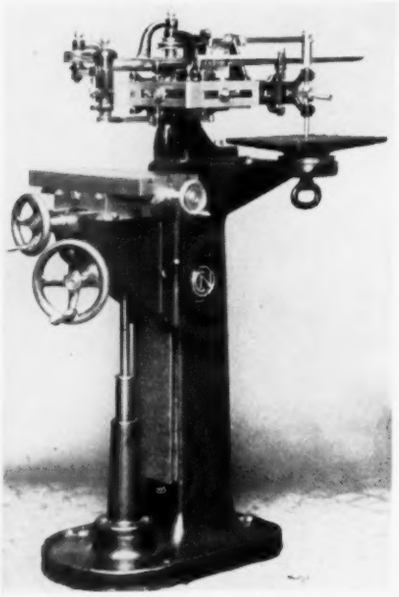
DISTINCTION

Sixty years of roll making, each year marked by contributions to the progress of the industry, have given Phoenix Rolls an earned reputation for performance and long life. These rolls have distinctive qualities which are recognized by rolling mills internationally.


PHOENIX Steel
For unusual strength.
PHOENIX "A" — Steel Alloy)
For strength and wear.
PHOENIXLOY (Uniformly Hard)
For flat rolling where high finish of extremely thin gauge material is required to be free from all marks or defects.
PHOENIX Metal (Iron Alloy)
PHOENIX "R"
For strength, wear and finish.
PHOENIX Chill
PHOENIX Nickel Chill
For all flat rolling requiring finish.
Also Tube Mill Rolls of quality material best suited to the kind of service required.

PITTSBURGH ROLLS CORPORATION
PITTSBURGH, . . PA.

Diesinking, Profiling, Engraving Unit — Marquette Machine Co., Toledo, O., with offices at 4256 Jackson boulevard, Chicago, now is offering a new automatic electrically-controlled universal diesinking, profiling, engraving pantograph machine



Marquette universal diesinking, profiling and engraving machine

in the third dimensional direction. This No. H-3 unit, shown herewith, is designed for machining large and small die casting molds, bakelite molds, embossing dies, and other blanking and forming dies. It should prove especially profitable to those engaged in the manufacture of the plastic synthetic products, etc., small automotive parts, embossing dies, etc.

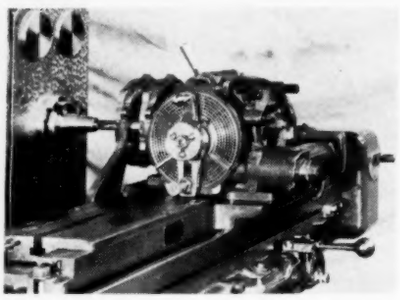
The company has aimed to construct a machine suitable and easily operated in order that employment of soft patterns or masters made of plaster or any other soft material could be realized. On older machines hard masters or patterns had to be used. The three dimensional arrangement is controlled through the tracer system which makes contact with the various feed motors for the right or left or up and down movements of the work table, thereby transferring the exact duplicate of the master no matter what contour the tracer is required to follow on die or mold. The contacts can be effected by the slightest movement of the tracer point either to the side or front, through a relay system which is concealed in a control panel box.

Pattern holder or master table is adjustable vertically in order to facilitate the use of high masters up to 12 inches. The No. H-3 Marquette not only copies in a ratio of 1-1, but reductions from 1-1 to 10-1 can be obtained. Thus enlarged models or patterns can be used. All lead screws and dials are read in 0.001-inch.

♦ ♦ ♦

Cam Milling Attachment—Kearney & Trecker Corp., Milwaukee, recently developed a new cam milling slide for use with its model K universal milling machines. The unit, in combination with the dividing head and tailstock furnished with the machine, converts the standard milling machine into a highly efficient and accurate cam miller. The unit consists of a special slide and base, and a roller bracket.

Power drive for the head is obtained from the spiral change gear unit on the end of the table. The slide movement is provided by pressure of the roller following the contour of the master cam. A weight attached to the slide, holds the roller



Kearney & Trecker cam milling attachment in operating position

firmly against the face of the master cam.

The slide is arranged so the dividing head spindle may be set parallel with, or at right angles to the machine spindle. The dividing head spindle is set at right angles to the machine spindle for milling barrel cams, and parallel as shown herewith, for milling face and peripheral cams. A right-angle drive bracket is used to carry the drive from the spiral change gear unit to the head when it is set parallel to the machine spindle.

One of the features of the attachment is that in many cases one finished cam can be used as the master cam for cutting duplicates. If ten cams of a certain kind are all that will ever be used, the cost of making a master cam can be saved by using the first cam as a master and cutting nine more. However, if duplicate cams are to be cut from time to time, it is advisable to make a master cam.

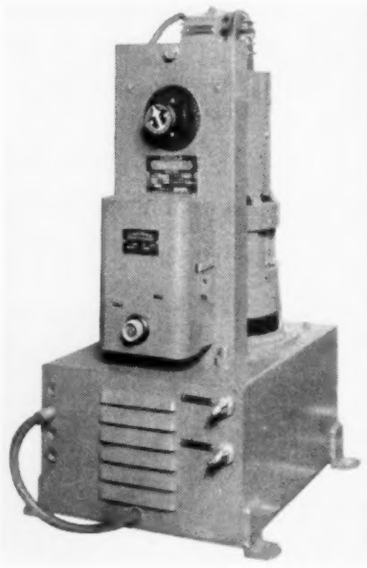
♦ ♦ ♦

Arc Welder—Lincoln Electric Co., Cleveland, announces that demands for an arc welder which can be used on thin sheets, plates and shapes by garages, metalworking shops and industrial plants are met by its new small motor-generator unit. This new welder, shown herewith, can be supplied for use on any alternating-current power line including 110-volt circuit.

The makers claim this new unit, known as the SA 75, is the first unit ever built which will deliver as low as 20 amperes at the arc without the use of auxiliary devices. As a result of this, an entirely new field of application for arc welding is opened up.

Since it supplies a uniform current of proper characteristics for using electrodes as small as 1/16-inch, this new welder can be employed by metalworking shops and industrial plants on materials as light as 24-gage. With the new welder it is possible to produce in light materials welds of the same uniformly high quality as that regularly obtained on heavier materials with the shielded arc process of welding, it is claimed.

The new SA 75 welder is of alternating current motor-driven type employing a 25 volt arc with a current range of 20 to 100 amperes. The generator is of single operator variable voltage type with 75 ampere N.E.



Lincoln arc welder for use on thin sheets, plates and shapes

Good surface and accuracy of size and shape are important. In addition to these characteristics Wissco Cold Rolled Strip gives you a workability that keeps processing costs at a minimum. It is when you work strip that *uniformity* counts, and products formed by stamping, bending, or deep drawing *are uniform* when made with Wissco Strip. It is regularly made in sizes up to 6 inches in width, from 3/16 to .003 inches in thickness, in bright, tinned copper and *cadmium* coated finishes. Use it and you will know why so many manufacturers have adopted Wissco Cold Rolled Strip.

This same uniformity is also found in Wissco Cold Rolled Specialties; such as Lock Spring Steel, Curtain Spring Steel, Bobby Pin Wire, Heddle Steel, Knife Blade Steel, Saw Steel and Flat Stitching Wire.

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WICKWIRE SPENCER STEEL COMPANY
New York City; Buffalo, Chicago, Worcester; Pacific Coast Headquarters: San Francisco; Warehouses: Los Angeles, Seattle, Portland. Export Sales Department: New York City.

Wissco Wire
by Wickwire Spencer

Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire—Valve Spring—Music—Clip—Pin—Hairpin—Hook and Eye—Broom—Stapling—Bookbinding—Machinery Spring Wire—Reed Wire—Clock—Pinion—Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

M.A. rating. The motor installed is the Lincoln "Linc Weld" 3-horsepower squirrel cage induction type for across-the-line starting. The welder is supplied for alternating current 110 and 550 or special voltages; 3, 2 or 1 phase; 60 and 50 cycles as desired. Connections are also readily available for 220 or 440 volts.

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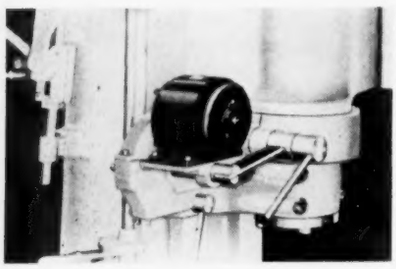
Torque Motors—Ohio Electric Mfg. Co., 5900 Maurice avenue, Cleveland, is calling attention to outstanding features of its torque motors. These units are used primarily



Ohio torque motor applied to clamp arm of radial drill to column

to replace solenoids, magnets, air or water cylinders or such devices as thrustors. They may be wound for very low no-load speeds so as to insure quiet and easy operation without banging or slapping. They may be designed to stall across the line for any period from five minutes to twenty-four hours a day, or continuous without overheating. The accompanying illustration shows the application of a torque motor to clamp arm of radial drill to column.

Torque motors are available and may be wound for all the various multiphase alternating currents, direct current and to a limited extent and at relatively low torque, for the single phase currents. They may be wound for various speeds from 250 to 1750 revolutions per minute and Ohio torque motors are available in sizes from 3 to 64 ounce feet or twelve times those figures in ounce inches. Thus a 64 ounce foot motor will exert a constant pressure of 4 pounds at 1 foot radius. These motors can exert much higher torque when appropriately geared.

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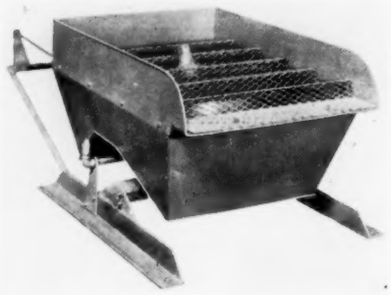
Gyratory Screen—Beardsley & Piper Co., 2541 North Keeler avenue, Chicago, recently brought out an all-purpose screen, shown herewith, known as the gyratory screen. The unit, the company declares, provides the following unique advantages:



Beardsley & Piper gyratory screen has 70 tons per hour capacity

Operates with a combination of circular, vertical oblique and forward and backward movement; has greater capacity per square foot of screen area; eliminates crushers and lump breakers; no vibration is imparted to adjacent superstructure; minimum head room, length and width is required; operating mechanism is dust sealed; screens are easily and quickly changed; lubrication is simple; no parts to wear or quickly break; only 1 horsepower or less is required for drive.

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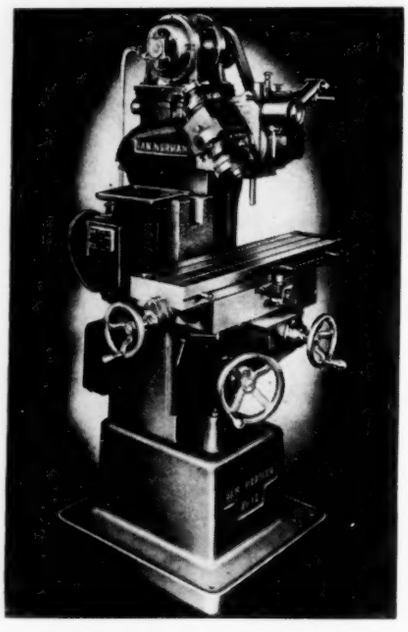
Miller—Van Norman Machine Tool Co., Springfield, Mass., has incoporated in its new miller a number of advanced features designed for modern toolroom and pattern shop conditions. This new No. 12 unit, shown herewith, retains the adjustable cutter head and movable ram typical of all millers built by the company. The cutter head is adjustable not only for



Rigidity is a feature of this new Van Norman miller

horizontal and vertical milling, but also for angular settings over a 90-degree range. With the sub-head attached to the face of the main head, almost any angular surface can be obtained through the full travel of the table, using a standard right angle cutter.

Saddle and table of the machine are considerably heavier than former Van Norman millers of corresponding range. The knee is a box type and other parts have been stiffened to give the No. 12 greater rigidity than in previous machines of the same size, allowing it to handle heavier work and at higher speeds. All cutter head drive gears are contained within the ram, the ram and the cutter head making up one complete unit having no driving connection with the rest of the machine.

Standard cutter speeds range from 70 to 1465 revolutions per minute and higher speeds can be obtained if desired. A motor is mounted on the top of the ram and the drive from the motor to the cutter head drive gears is by a heavy V-belt. A separate motor mounted at the back of the machine below the feed gear box serves for the table feed.

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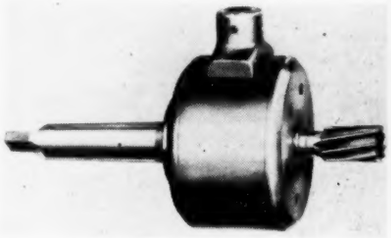
High-Speed Milling Head—Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman boulevard, Detroit, announces a new high-speed milling



High-speed milling head developed by Ex-Cell-O Aircraft & Tool Corp.

head that is adapted for use on horizontal boring mills and milling machines. This unit provides a higher range of speed which is required for the smaller sizes of end mills and drills. When milling small pockets and keyways and drilling small holes in large castings on boring mills or milling machines, a great deal of time and expense is saved by having the proper range of high spindle speeds.

The accompanying illustration shows a close-up view of the head. Driving shank of the head is furnished with a No. 5 Morse taper which makes it adaptable for use in all boring mills and milling machine spindles. The spindle in the high-speed head is furnished with a No. 4 Morse

OPEN HEARTH or Electric Furnace STEELS?

TIMKEN *Makes Both*

Timken dominance as a manufacturer of electric furnace alloy steels sometimes overshadows Timken's importance as a producer of fine OPEN HEARTH steels.

15,000 tons per month of Timken Open Hearth Alloy Steels—made by a company whose standards are set by fine electric furnace steels—available in all standard and special analyses.

THE TIMKEN STEEL & TUBE COMPANY, CANTON, OHIO

District Offices or Representation in the following cities: Detroit Chicago New York Los Angeles Boston Philadelphia Houston Buffalo Rochester Syracuse Tulsa Cleveland Erie *World's Largest Producer of Electric Furnace Steel*

TIMKEN ALLOY STEELS

ELECTRIC FURNACE AND OPEN HEARTH • ALL STANDARD AND SPECIAL ANALYSES

taper which represents the most popular size for end mills, drills, chucks, etc.

Step-up ratio of the head is four to one over the spindle speed of the machine. The unit is designed for a top speed of 1500 revolutions per minute on the high-speed milling spindle and has a maximum capacity of 1-inch diameter end mills and 1-inch diameter drills in steel. The body of the milling head and the driving shank are of one-piece construction.

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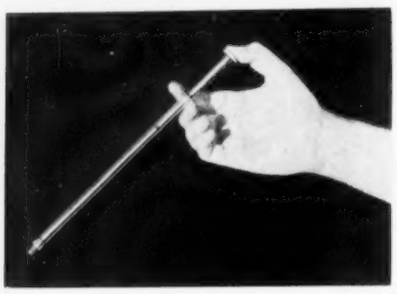
Handy Holding Tool—Bonney Forge & Tool Works, Allentown, Pa., recently introduced a hand screw-



Handy holding tool offered by Bonney Forge & Tool Works

holding, gripping, inserting, removing and picking-up tool. It is for use on screws, washers, nuts, bolts, taper pins, valve pins and many similar objects. The device, shown herewith, consists of four fingers on a tube, which operate within a second tube. The four fingers open to grasp the object when pressure is brought on the plunger. On release of the pressure, the strong spring causes the fingers to close tightly around the object. The object is then turned out or removed. The holding tool is made in three sizes with 4, 6 and 8-inch reach. It is finished in nickel and is strong and sturdy.

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Closed Back Shovel—Wood Shovel & Tool Co., Piqua, O., recently introduced a new closed back shovel, shown herewith. This new tool in many ways resembles the familiar hollow back type except that, instead of the usual hollow in the back of the blade, there is a steel plate welded securely to the blade and extending up into the socket. The upper part of the plate, however, is free to permit flexing and, since there is no strain on the insert, it cannot pull loose, it is claimed. By this construction, the one piece steel blade is made smooth both front and back.

Closed back shovel placed on the market by Wood Shovel & Tool Co.

and yet permits the use of tapered socket which is heat-treated to provide greater strength and springiness than a heavy solid shank offers.

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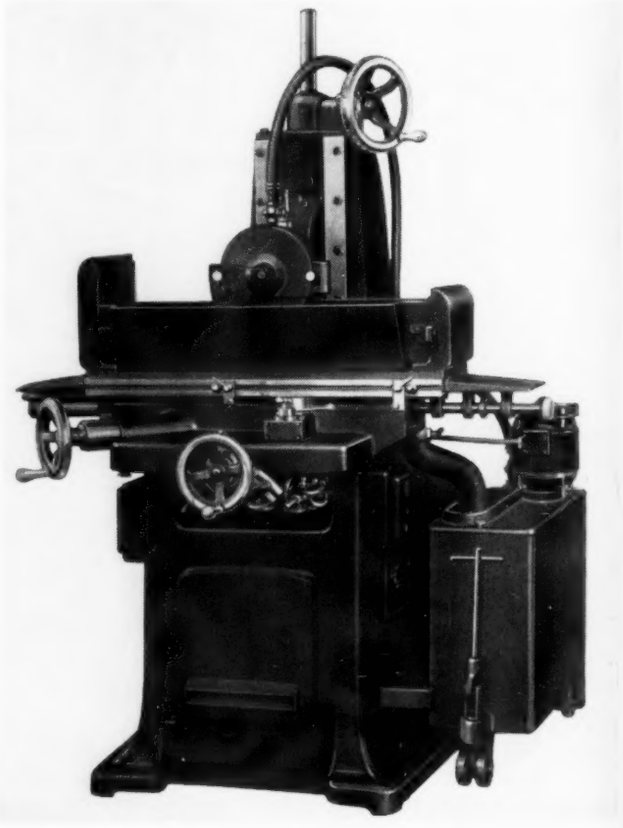
Surface Grinder—Gallmeyer & Livingston Co., Grand Rapids, Mich., has just placed a new hydraulic feed surface grinder on the market. The machine which is shown in the accompanying illustration has a table working surface of 6 x 18 inches, and automatic longitudinal and transverse movements are sufficient to cover the entire working surface with a ½-inch wheel which is standard equipment.

The machine is built around a one-piece column and base casting weighing over 1000 pounds which is said to provide permanence of alignment between the cross saddle ways and the upright head ways. The hydraulic mechanism is mounted inside the base and driven by a 1-horsepower, 1200 revolutions per minute motor. Practically any desired longitudinal table speed up to a maximum of over 50 feet per minute may be obtained. A lever on the front of the saddle controls the speed.

The machine is obtainable with a self-contained motor driven dust arrester system and also with a portable, self-contained, motor driven coolant system as illustrated. The portable tank stands on the front against the base of the machine. The cover of the tank carries a vertical type, ball bearing motor on the shaft of which is mounted a spider type vane pump. No bearings are under water. The tank is of ample capacity, and has a vertical partition rising to within 4 inches of the top. That makes a compartment occupying between one-fourth to one-third of the tank's capacity in which the pump sets. The remainder of the tank contains an angular baffle plate which extends from the top down to within 4 inches from the bottom, and to within 4 inches of the end of the tank. Consequently any abrasive particles must settle down to the bottom, go under the baffle, and then rise over the first mentioned partition to reach the pump.

The portable feature is said to provide maximum convenience in cleaning the tank. The cover is removed complete with the small ¼-horsepower motor and pump mechanism. Then the tank is detached quickly from the machine, and moved to a suitable location for dumping, flushing and refilling.



Hydraulic feed surface grinder developed by Gallmeyer & Livingston Co. is built around a heavy one-piece column and base casting to provide rigidity

Outlook Improves, Despite Wavering Rate

More Activity in Markets—Navy Buys at Firm Prices—Scrap Makes Further Gains at Pittsburgh—Barge Work Increases—Structural Work Heavier

MORE favorable features are apparent in the iron and steel markets, resulting from a quickening in seasonal manufacturing operations, and the better feeling being established between business and the national administration.

Despite conservative consumer commitments, gaged by size of orders, steelmakers are confident the base is being laid for much broader improvement. Business appears to have discounted the results of the November election, and to be making progress. In some instances steel production schedules have been stepped up in response to slight gains in tonnage, and in preparation for larger demands in the approaching month. The national average of steelworks operations last week, however, dropped 1 point to 25½ per cent.

Purchasing by small users with fairly steady requirements has been more consistent recently than from large consumers, who have been specifying in less-carload quantities to round out stocks. With automobile manufacturers nearing the starting line on 1935 assemblies, more activity in farm implement, stove and radiator manufacture, tonnage buyers are becoming more of a factor in the markets. November is expected to develop further recession in production of present automobile models, but will mark a definite beginning on new models by leading manufacturers.

Navy Awarding 4000 Tons of Plates; 3000 Tons of Shapes Placed for Strip Mill

Attesting the government's acceptance of steel prices, the navy last week purchased 565 tons of plates and bars at the open market prices bid Aug. 28, the first substantial purchase since NRA's recent ratification of the steel code and price policies. Four thousand tons of plates which the navy has been withholding since they were bid Oct. 12 are to be awarded this week. High-carbon spring wire has been reduced $6 a ton.

River barge work has become more active at Pittsburgh, coal and transportation interests about to close on 20 units, and an inquiry for 24 coal barges by a Chicago interest pending. Structural shape awards for the week increased slightly to 14,183 tons, topped by 3000 tons for a cold-rolled strip mill building for Youngstown Sheet & Tube Co.

General contracts were awarded last week for the Los Angeles aqueduct project and 51,550 tons of steel is to be purchased shortly, 45,000 tons being reinforcing bars, one of the largest single orders for this material on record.

Colonial Beacon Oil Co., Albany, N. Y., has awarded six tanks, requiring 1000 tons of plates. Five thousand tons of steel pipe may be required for the New York postoffice, on bids Nov. 9.

Railroads are being offered a reduction from 4½ to 3½ per cent in interest charged for government loans, but except for buying more machine tool repair parts to rehabilitate shop equipment they appear to be retrenching. Norfolk & Western has issued a tentative inquiry for 10,000 tons of rails for delivery next year. Anglo-Mexican Petroleum Corp., New York, has purchased 75 tank cars and the Delaware River Bridge commission is in the market for 44 subway cars. Union Pacific has ordered 20 motorcoaches, and Chicago Motor Coach Co., 75.

Scrap Stronger at Pittsburgh, Chicago; Eastern Steelmakers Liquidating Stocks

Further advances in scrap prices at Pittsburgh have made the net gain there 75 cents a ton, and the market also is stronger at Chicago. In eastern districts, however, steelmakers are reducing scrap inventories.

Japanese interests have applied to their government for permission to import 100,000 tons of steel to repair damage to areas recently swept by typhoons. STEEL's London cablegram states British makers have booked 4000 tons of steel for a tanker for a South American company.

Steelworks operations at Cleveland last week increased 7 points to 38 per cent; Wheeling 6 to 29; Pittsburgh 1 to 21; Chicago ½-point to 27½; eastern Pennsylvania ½ to 20. Youngstown was off 4 to 26; Birmingham 15 to 10. Detroit held at 59; New England 40; and Buffalo 24.

Due to the rise in scrap, STEEL's iron and steel price composite is up 3 cents to $32.12; the finished steel index is unchanged at $54; while the iron and steel scrap composite has advanced 17 cents to $9.54.

COMPOSITE MARKET AVERAGES

	Oct. 27	Oct. 20	One Month Ago Sept., 1934	Three Months Ago July, 1934	One Year Ago Oct., 1933	Five Years Ago Oct., 1929
Iron and Steel Composite	$32.12	$32.09	$32.15	$32.32	$30.53	$35.85
Finished Steel Composite	54.00	54.00	54.00	54.05	49.20	56.79
Steelworks Scrap Composite	9.54	9.37	9.45	10.30	10.37	15.44

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip and cast iron pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Oct. 27, 1934	Sept. 1934	July 1934	Oct. 1933
Finished Material				
Steel bars, Pittsburgh	1.80	1.80	1.80	1.75
Steel bars, Chicago	1.85	1.85	1.85	1.80
Steel bars, Philadelphia	2.09	2.09	2.09	2.04
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.60
Shapes, Pittsburgh	1.80	1.80	1.80	1.70
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.85	1.75
Tank plates, Pittsburgh	1.80	1.80	1.80	1.70
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.85	1.75
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.75
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	2.85
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.85
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Tin plate, per base box, Pitts.	5.25	5.25	5.25	4.65
Wire nails, Pittsburgh	2.60	2.60	2.60	2.10
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	28.00	28.00	26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00

	Oct. 27, 1934	Sept. 1934	July 1934	Oct. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.76	19.76	19.76	19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	17.76
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2 foundry, Chicago	18.50	18.50	18.50	17.50
Southern No. 2, Birmingham	14.50	14.50	14.50	13.50
No. 2X eastern, del. Philadelphia	20.63	20.63	20.63	17.76
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.54
Gray forge, del. Pittsburgh	18.88	18.88	18.88	18.38
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	87.24
Scrap				
Heavy melting steel, Pittsburgh	$11.00	10.75	12.00	12.45
Heavy melt. steel, No. 2, east. Pa.	8.00	8.00	8.40	9.20
Heavy melting steel, Chicago	8.75	8.65	9.55	9.35
Rails for rolling, Chicago	10.25	10.05	10.85	11.10
Railroad steel specialties, Chicago	9.75	9.80	10.50	10.50
Coke				
Connellsville, furnace, ovens	3.60	3.60	3.60	3.25
Connellsville, foundry, ovens	4.60	4.60	4.60	3.85
Chicago, by-product foundry, del.	9.25	9.25	9.25	8.75

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.85c
Gary, base	1.95c
Chicago, del.	1.98c
New York, del.	2.18c
Philadelphia, del.	2.14c
Birmingham, base	2.00c
St. Louis, del.	2.17c
F.o.b. cars, dock, Pacific ports	2.40c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.40c
Gary, base	2.50c
Chicago, del.	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham, base	2.55c
St. Louis, del.	2.72c
F.o.b. cars, dock, Pacific ports	3.05c

GALVANIZED No. 24

Pittsburgh, base	3.10c
Gary, base	3.20c
Chicago, del.	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham, base	3.25c
St. Louis, del.	3.42c
San Francisco, f.o.b. cars, dock	3.70c

TIN MILL BLACK No. 28

Pittsburgh, base	2.75c
Gary, base	2.85c
St. Louis, del.	3.07c

COLD ROLLED No. 10

Pittsburgh, base	2.50c
Gary, base	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
F.o.b. cars, dock, Pacific ports	3.10c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, base	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

ENAMELING SHEETS

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher.

Tin plate, coke base contract	$5.25
Do., stock	$4.90
Long ternes, No. 24 unassorted	3.40c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 32.00c

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, del.	2.20c
Buffalo, del.	2.03½c
Chicago or Gary base	1.85c
Cleveland, del.	1.98½c
Birmingham, base	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific Coast, f.o.b. cars, dock	2.35c
St. Louis, del.	2.07c

Structural Shapes

Pittsburgh, base	1.80c
Philadelphia, del.	2.00½c
New York, del.	2.05¼c
Boston, del.	2.18½c
Bethlehem, base	1.90c
Chicago, base	1.85c
Cleveland, del.	1.98½c
Buffalo, base	1.90c
Gulf ports	2.20c
Birmingham, base	1.95c
Pacific Coast, f.o.b. cars, dock	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.80c
Chicago or Gary	1.85c
Duluth, base	1.95c
Birmingham, base	1.95c
Cleveland, base	1.85c
Buffalo	1.90c
Detroit, del.	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, del.	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

RAIL STEEL
To Manufacturing Trade

Pittsburgh, base	1.70c
Chicago or Gary, base	1.75c
Moline, Ill., base	1.75c
Cleveland, base	1.75c
Buffalo, base	1.80c

IRON

Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia, base	1.89c
Pittsburgh, refined	2.75c-7.50c

REINFORCING

New billet, cut lengths, c. l.

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pitts.-Cleve., 100 lb. keg

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
Do., 16 gage and finer	5 10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

*Spring wire, Pittsburgh or Cleveland 2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting □ □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot) □

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100 .15 to .25 Mo.			0.50
4600 .20 to .30 Mo. 125-1.75 Ni.			1.05
5100 .80-1.10 Cr.			0.45
5100 Cr. spring			base
6100 bars			1.20
6100 spring			0.70
Cr., Ni., Van.			1.50
Carbon Van.			0.95
9250....Carbon base plus extras			

Piling □ □

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops □

Hot strip to 23⅞-in.

Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham, base	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del.	2.18c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve	2.60c
Worcester, Mass.	2.80c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$27.00
50-60 lbs.	$24.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual., Pittsb., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thrd. 70-10-10-10 off

Rolled thread, ½ x 6 and smaller 70-10-10-10 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts 70-10-10-10 off

Tire bolts 60-10-10 off

Stove bolts, 75 off in pkgs.; 83 off in bulk, 15,000 or more of a size.

Rolled thread machine bolts, ½ x 6 and smaller 70-10-10-10 off

Step bolts 70-10-10 off

Elevator bolts 70-10-10 off

NUTS

S.A.E. semifinished hex.; ½ to ⅞-inch. 70-10-10-10 off

Do., ½ to 1-inch 75 off

Do., over 1-inch 70-10 off

HEXAGON CAP SCREWS

Milled 85 off

Upset, 1-in., smaller 85-10 off

SQUARE HEAD SET SCREWS

Upset, 1-in., small 80 off

Headless set screws 75-10 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.00 off

Cut Nails □ □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25 72
2	41½	26

LAP WELD

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel

½, butt weld	57½
⅛-inch, but weld	50½
¼—⅜, buttweld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½-inch, black and galv. take 4 pts.. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¾—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron; 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
3-in & over, east fdy	42.00
Do., 4-in.	45.00

Class A pipe $2 over Class B

Stnd. fitgs., Birm. base $100.00

Semifinished Steel □

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O., and Sparrows Point, Md.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville, fur	$3.60- 3.85
Connellsville, fdry.	4.60
Connell. prem. fdy.	5.10
New River fdry	6.00
Wise county fdry.	4.45- 5.25
Wise county fur.	4.00- 4.50

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del	9.25
New England, Del.	10.50
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants. Tank lots

	Spot
Pure benzol	19.00c
90 per cent benzol	19.00c
Toluol	30.00c
Solvent naphtha	26.00c
Commercial xylol	26.00c

Per lb. f.o.b. New York

Phenol (200 lb drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

†Naphthalene flakes and balls, in bbl.	6.00c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25; 50-cent differentials apply to any grade below 1.75. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	.....	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmghm.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem	20.89	21.39	.....	.....
Philadelphia from Birmingham	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh district from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point: †Johnson City, Tenn.—$23.50

†Off grade material is $19.50

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore □ □

LAKE SUPERIOR ORE
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

EASTERN LOCAL ORES
Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00

Manganese Ore □

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories □ □

Per 1000 f.o.b. Works

FIRE CLAY BRICK
First Quality

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00
Intermediary	36.00
Second quality	25.00
MALLEABLE BUNG BRICK	
All bases	50.00
SILICA BRICK	
Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00
MAGNESITE	
Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	40.00
Domestic dead-burned grains, net ton f.o.b Chewelah, Wash.	22.00
BASIC BRICK	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5 □ □

Washed gravel, duty paid, tide, net ton	$19.50
Washed gravel, f.o.b. Ill., Key., net ton, carloads	$15.50-16.00

Ferroalloys □ □

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20% dom. fur. spot†	26.00
Ferrosilicon 50%, freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00

Spot, $5 a ton higher.

Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%, 105.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%. Rockdale Tenn., basis, 18%, $2 unitage	42.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	55.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper

Sheets	
Yellow brass (high)	14.50
Copper, hot rolled	16.00
Lead, cut, to jobbers	7.50
Zinc, 100-lb. base	9.50
Tubes and Pipes	
High yellow brass	17.00
Seamless copper	17.25
Rods	
High yellow brass	13.00
Copper, hot rolled	13.25
Anodes	
Copper untrimmed	13.75
Wire	
Yellow brass (high)	15.00

Old Metals □ □

Deal, buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.25- 4.50
*Chicago	4.12½-4.37½
*Cleveland	4.75- 5.00
St. Louis	4.00- 4.25
Heavy Copper and Wire	
*New York	5.50- 5.75
*Chicago, No. 1	5.37½-5.62½
*Cleveland	5.25- 5.37½
St. Louis	4.75- 5.00
Composition Brass Borings	
*New York	3.87½-4.12½
Light Copper	
*New York	4.62½- 5.00
*Chicago	4.00- 4.25
*Cleveland	4.25- 4.75
St. Louis	4.00- 4.25
Light Brass	
*Chicago	2.00- 2.25
*Cleveland	2.50- 2.75
Lead	
New York	2.75- 3.00
Cleveland	2.75- 2.90
*Chicago	2.75- 3.00
*St. Louis	2.75- 2.85
Zinc	
New York	1.75- 2.00
Cleveland	1.75- 1.85
St. Louis	2.50- 2.60
Aluminum	
Borings, Cleveland	6.00- 7.00
Mixed, cast, Cleve.	10.25-11.00
*Mixed, cast, St. L.	10.25-10.50
Clips, soft, Cleve.	12.00-13.00

Secondary Metals □

Brass ingot, 85-5-5-5	8.25
Stand. No. 12 Alum.	14.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL	□
Birmingham	8.00- 8.50
Boston, dealers	5.00- 5.25
Buffalo, No. 1	9.50-10.00
Buffalo, No. 2	8.50- 9.00
Chicago, No. 1	8.50- 9.00
Cleveland, No. 1	8.00- 8.50
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1	7.50- 8.00
Detroit, No. 2	6.50- 7.00
Eastern Pa.	9.50- 9.75
Eastern Pa., No. 2	8.00- 8.50
Federal, Ill.	7.00- 7.50
Granite City, R. R.	6.50- 7.00
Granite City, No. 2	6.00- 6.50
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	6.50
Pittsburgh, No. 1	10.75-11.25
St. Louis	6.50- 7.00
Valleys, No. 1	10.50
COMPRESSED SHEETS	□
Buffalo, dealers	8.50- 9.00
Chicago, factory	7.50- 8.00
Cleveland	7.00- 7.50
Detroit	7.50- 8.00
E. Pa., new mat.	9.00- 9.50
Pittsburgh	10.75-11.25
St. Louis	5.00- 5.50
Valleys	10.00
BUNDLED SHEETS	□ □
Buffalo	6.50- 7.00
Cincinnati, del.	6.00- 6.50
Cleveland	6.50- 7.00
Pittsburgh	9.00- 9.50
St. Louis	4.00- 4.25
SHEET CLIPPINGS, LOOSE	□
Chicago	4.00- 4.50
Cincinnati	4.50- 5.00
Detroit	4.50- 5.00
St. Louis	3.50- 4.00
STEEL RAILS, SHORT	□
Birmingham	10.00-10.50
Buffalo	11.50-12.00
Chicago (3 ft.)	10.50-11.00
Chicago (2 ft.)	11.50-12.00
Cincinnati, del.	9.75-10.25
Detroit	10.00-10.50
Pitts., open-hearth, 3 ft. and less	13.50-14.00
St. Louis, 2 ft. & less	10.00-10.50
STEEL RAILS, SCRAP	□
Boston	5.00- 5.25
Chicago	8.50- 9.00
Pittsburgh	10.00-10.50
STOVE PLATE	□ □
Birmingham	5.50- 6.00
Boston, dealers	3.25- 3.75
Buffalo	8.50- 9.00
Chicago, net	5.50- 6.00
Cincinnati, dealers	5.00- 5.50
Detroit, net	6.00- 6.50
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.00- 5.50
COUPLERS, SPRINGS	□
Buffalo	12.00-12.50
Chicago, springs	9.50-10.00
Eastern Pa.	12.50-13.00
Pittsburgh	13.50-14.00
St. Louis	8.00- 8.50
ANGLE BARS—STEEL	□
Chicago	9.00- 9.50
St. Louis	7.50- 8.00
RAILROAD SPECIALTIES	□
Chicago	9.50-10.00
LOW PHOSPHORUS	□ □
Buffalo, billets and bloom crops	11.50-12.00
Cleveland, billet, bloom crops	13.00-13.50
Eastern Pa., crops	13.50-14.00
Pittsburgh, billet, bloom crops	13.50-14.00
Pittsburgh, sheet bar crops	13.00-13.50
FROGS, SWITCHES	□ □
Chicago	8.50- 9.00
St. Louis, cut	8.50- 9.00
SHOVELING STEEL	□ □
Chicago	8.50- 9.00
Federal, Ill.	6.75- 7.00
Granite City, Ill.	6.00- 6.50
RAILROAD WROUGHT	□
Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	7.50- 8.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1, net	7.00- 7.50
Chicago, No. 2	8.50- 9.00
Cincinnati, No. 2	7.00- 7.50
Eastern Pa.	10.50
N. Y., No. 1, deal.	7.00- 7.50
St. Louis, No. 1	5.75- 6.25
St. Louis, No. 2	6.75- 7.25
SPECIFICATION PIPE	□
Boston	3.00- 3.25
Eastern Pa.	8.00
New York, dealers	3.50- 4.00
BUSHELING	□ □
Buffalo, No. 1	8.50- 9.00
Chicago, No. 1	7.00- 7.50
Cinci., No. 1, deal.	5.50- 6.00
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	6.50- 7.00
Detroit, No. 1, new	6.50- 7.00
Valleys, new No. 1	9.75
MACHINE TURNINGS	□
Birmingham	4.50- 5.00
Boston, dealers	1.25
Buffalo	4.75- 5.25
Chicago	4.50- 5.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.00- 6.50
Detroit	4.50- 5.00
Eastern Pa.	5.00- 5.50
New York, dealers	1.75- 2.00
Pittsburgh	7.00- 7.50
St. Louis	3.00- 3.50
Valleys	8.00- 8.25
BORINGS AND TURNINGS	□
For Blast Furnace Use	
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.50- 7.00
Detroit	5.50- 6.00
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	5.50- 6.00
CAST IRON BORINGS	□
Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Chicago	4.50- 5.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.75- 7.25
Detroit	5.50- 6.00
E. Pa., chemical	12.00-13.00
New York, dealers	1.50- 1.75
Pittsburgh	5.50- 6.00
St. Louis	3.00- 3.50
PIPE AND FLUES	□ □
Cincinnati, dealers	4.00- 4.50
RAILROAD GRATE BARS	□
Buffalo	6.50- 7.00
Chicago, net	5.00- 5.50
Cincinnati	4.00- 4.50
Eastern Pa.	8.00
New York, dealers	4.00- 4.50
St. Louis	4.00- 4.50
FORGE FLASHINGS	□ □
Boston, dealers	3.75- 4.00
Buffalo	8.50- 9.00
Cleveland	7.00- 7.50
Detroit	6.00- 6.50
FORGE SCRAP	□ □
Boston, dealers	3.75
Chicago, heavy	9.50-10.00
Eastern Pa.	9.00
ARCH BARS, TRANSOMS	□
St. Louis	10.00-10.50
AXLE TURNINGS	□ □
Boston, dealers	3.00- 3.50
Buffalo	7.00- 7.50
Chicago, elec. fur.	7.50- 8.00
Cleveland	6.00- 6.50
Eastern Pa.	9.00
St. Louis	6.00- 6.25
STEEL CAR AXLES	□ □
Birmingham	10.00-10.50
Boston, ship. point	10.00-10.50
Buffalo	12.00-12.50
Chicago, net	10.00-10.50
Eastern Pa.	14.00-15.00
St. Louis	10.00-10.50
SHAFTING	□ □
Boston, ship. point	10.50-11.00
Eastern Pa.	16.00
New York, dealers	10.75-11.25
St. Louis	11.00-11.50
CAR WHEELS	□ □
Birmingham, iron	9.00- 9.50
Boston, iron deal.	5.00- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.00-12.50
Chicago, iron	9.50-10.00
Chicago, rolled steel	9.50-10.00
Cincinnati, iron	7.50- 8.00
Eastern Pa., iron	10.50-11.00
Eastern Pa., steel	12.50-13.00
Pittsburgh, iron	10.00-10.50
Pittsburgh, steel	13.50-14.00
St. Louis, iron	7.25- 7.75
St. Louis, steel	8.75- 9.25
NO. 1 CAST SCRAP	□ □
Birmingham	8.50- 9.00
Boston, No. 2	6.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	9.50-10.00
Buffalo, mach.	10.50-11.00
Chicago, agri. net	7.50- 8.00
Chicago, mach. net	8.50- 9.00
Chicago railroad net	8.00- 8.50
Cinci., mach. cup.	8.50- 9.00
Cleveland, cupola	10.75-11.25
Detroit, net	8.50- 9.00
Eastern Pa., cupola	11.00
Pittsburgh, cupola	12.00-12.50
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	6.50- 7.00
St. L., No. 1 mach.	8.50- 9.00
HEAVY CAST	□ □
Boston, del.	4.50- 4.75
Buffalo, break.	7.75- 8.25
Cleveland, break.	7.50- 8.00
Detroit, break.	6.50- 7.00
Detroit, auto net	9.00- 9.50
Eastern Pa.	9.50
N. Y., break. deal.	5.25- 5.75
Pittsburgh	10.00-10.50
MALLEABLE	□ □
Boston, consum.	10.00-10.50
Buffalo	10.50-11.00
Chicago, R. R.	10.00-10.50
Cincinnati, agri. del.	7.50- 8.00
Cleveland, rail	10.75-11.25
Detroit, auto	8.50- 9.00
St. Louis, R. R.	7.00- 7.50
Eastern Pa., R. R.	10.50-11.00
RAILS FOR ROLLING	□
5 feet and over	
Birmingham	9.50-10.00
Boston, dealers	8.00- 8.50
Buffalo	10.25-10.75
Chicago	10.00-10.50
Eastern Pa.	12.00-12.50
New York, dealer	7.50- 8.00
St. Louis	9.00- 9.50
LOCOMOTIVE TIRES	□
Chicago (cut)	9.00- 9.50
St. Louis, No. 1	9.50-10.00
LOW PHOS. PUNCHINGS	□
Buffalo	12.00-12.50
Chicago	11.00-11.50
Eastern Pa.	14.50-15.00
Pittsburgh	12.50-13.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper			Straits Tin		Lead		Zinc	Aluminum	Antimony	Nickel
	Electro., del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	Futures	N. Y.	East St. L.	St. L.	99%	Spot, N. Y.	Cathodes
Oct. 20	9.00	9.12½	7.37½	51.25	51.27½	3.70	3.55	3.82½	*19.00	9.50	35.00
Oct. 22	9.00	9.12½	7.37½	51.00	51.02½	3.70	3.55	3.85	*19.00	9.50	35.00
Oct. 23	9.00	9.12½	7.37½	51.10	51.15	3.70	3.55	3.85	*19.00	9.50	35.00
Oct. 24	9.00	9.12½	7.37½	51.25	51.30	3.70	3.55	3.85	*19.00	9.50	35.00
Oct. 25	9.00	9.12½	7.50	51.15	51.22½	3.70	3.55	3.85	*19.00	9.37½	35.00
Oct. 26	9.00	9.12½	7.50	51.20	51.25	3.70	3.55	3.82½	*19.00	9.50	35.00

*Nominal range 19.00c to 21.00c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c

REINFORC. BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young	2.30c-2.60c

SHAPES	
Baltimore*	3.90c
Boston††	3.17c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*	2.90c
Boston††	3.18c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.95c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore*	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.00c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles	3.80c
New Orleans	3.55c
New York	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*†	3.51c
Boston (g)	3.90c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.93½c
Los Angeles	4.45c
New York	3.85c
Philadelphia*†	3.55c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore *†.	4.21c
Buffalo	4.00c
Boston (g)	4.60c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles	5.05c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c

BANDS	
Baltimore*	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.38½c
Houston	3.25c
Los Angeles	3.90c
New Orleans	3.95c
New York(d)	3.62c
Philadelphia	3.15c
Pittsburgh(h)	3.20c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c

HOOPS	
Baltimore	2.80c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
New York	3.62c
Philadelphia	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore(c)	3.71c
Boston	4.00c-4.50c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland(h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
New Orleans	4.30c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle(f)(d)	4.75c
St. Paul	3.20c
St. Louis	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 25

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports	Continental Channel or North Sea ports, metric tons	
PIG IRON	£ s d	Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Silicon	$14.91 3 0 0	$13.41	1 13 0
Basic bessemer	13.42 2 14 9*	12.59	1 11 0
Hematite, Phos. .03-.05	15.03 3 0 6	.....	.....
SEMIFINISHED STEEL			
Billets	$27.34 5 10 0	$19.10	2 7 0
Wire rods, No. 5 gage	38.77 7 16 0	27.57	4 10 0
FINISHED STEEL			
Standard rails	$38.52 7 15 0	$44.71	5 10 0
Merchant bars	1.67c 7 10 0	1.10c	3 0 0
Structural shapes	1.64c 7 7 6	1.14c	3 1 6
Plates, †¾ in. or 5 mm	1.78c 8 0 0	1.52c	4 2 6
Sheets, black, 24 gage or 0.5 mm	2.05c 9 5 0	1.95c	5 5 0
Sheets, gal., 24 gage, corr.	2.50c 11 5 0	2.39c	6 10 0
Bands and strips	1.83c 8 5 0	1.47c	4 0 0
Plain wire, base	2.05c 9 5 0	1.99c	5 7 6
Galvanized wire, base	2.50c 11 5 0	2.30c to 2.33c	6 5 6 to 6 7 6
Wire nails, base	2.66c 12 0 0	2.12c	5 15 0
Tin plate, box 108 lbs.	$ 4.47 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$16.77	3 7 6(a)	$13.88	210	$14.51	310	$25.41	63
Basic bessemer pig iron	16.77	3 7 6(a)*	12.22	185	13.34	285	28.03	(b)69.50
Furnace coke	4.35	0 17 6	7.93	120	5.15	110	7.66	19
Billets	27.34	5 10 0	28.42	430	20.59	440	38.92	96.50
Standard rails	1.83c	8 5 0	2.10c	700	2.31c	1,100	2.42c	132
Merchant bars	1.91c	8 12 0	1.68c	560	1.16c	550	2.01c	110
Structural shapes	1.94c	8 15 0	1.65c	550	1.16c	550	1.97c	107.50
Plates, †¼-in. or 5 mm	1.87c	8 8 9	2.10c	700	1.47c	700	2.32c	127
Sheets, black	2.33c	10 10 0§	2.55c	850‡	1.63c	775‡	2.64c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	2.89c	13 0 0	4.50c	1,500	3.15c	1,500	6.77c	370
Plain wire	2.05c	9 5 0	3.39c	1,130	2.31c	1,100	3.17c	173
Bands and strips	2.08c	9 7 0	1.95c	650	1.47c	700	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January.

**Gold pound sterling carries a premium of 67.647 per cent over paper sterling.

(b) Plus straightening, cutting and quantity differentials.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

(f) Rounds only.

(g) 50 bundles or over.

(h) Outside delivery, 10c less.

‡Domestic bars.

*Plus quan. extras.

**Under 25 bundles.

*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

THE YEARBOOK ISSUE

JANUARY 7, 1935

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Bars

Bar Prices, Page 54

Pittsburgh — Merchant steel bar orders dwindled last week after a fair week preceding. Miscellaneous manufacturing concerns apparently have sufficient stocks, although moderate buying continues by agricultural implement makers. The carbon bar market is steady at 1.80c, Pittsburgh, and alloy bars are firm at 2.45c, Pittsburgh. Although actual inquiries have not yet appeared, producers expect to submit bids soon on several thousand tons of rounds, flats and small angles for export to Japan, according to recent report of a prospective inquiry.

Cleveland — Steel bar tonnage booked here in October is nearly twice that in September, mainly accounting for the lighting of two more open hearths last week by the Cleveland producer. Forging shops are receiving larger inquiries from automobile manufacturers. Although relatively small, orders from that industry are increasing. General Motors Truck Corp. has booked 75 double-deck coaches for the Chicago Motor Coach Co., which will require a considerable amount of stainless steel. Arthur G. McKee Co., Cleveland, has taken a dust precipitator for the Ford Motor Co., Detroit, 100 tons of sfeel, mainly bars. The Electric Auto-Lite Co., Toledo, O., has a contract for the ignition equipment for the new small Packard cars.

Chicago — While steel bar sales and specifications show only slight improvement, acceleration in demand from the automotive industry is in prospect. Farm implement manu facturers are fairly active bar users. Evidence that additional bar users have consumed stocks accumulated earlier this year is seen in the reentry of such buyers in the market for the first time in several months. Orders still are limited to early needs with little forward buying.

Boston—Commercial steel bars are dull, with buying in small lots. Operating schedules with most industrial consumers are unchanged. For Newport, R. I., delivery the navy has bids on 130 tons of pearlitic manganese and manganese-alloy bars, mainly the former, on which the low bid is 3.155c, delivered, submitted by most bidders.

Philadelphia — Commercial steel bar specifications reflect substantial improvement in bolt and nuts business since the recent further reduction went into effect on bolts and nuts. Placing of a tonnage of black bars by the navy this week at prices submitted by producers Aug. 28, has imparted further strength to the steel bar market and supports the general belief that firm quotations will be submitted to the navy at its opening Nov. 2 on 178 tons of galvanized bars and bands. This opening was originally scheduled for Oct. 12, and when postponed, it was generally assumed in the trade that the navy was marking time, pending a possible break in prices. Commercial steel bars are 1.80c, Pittsburgh, or 2.09c, Philadelphia. Common iron bars are fairly steady at 1.99c, Philadelphia.

New York—A better movement is noted in bars, due largely to more activity among bolt and nut manufacturers. Railroads are still buying slowly. The market is 1.85c, Pittsburgh, or 2.18c, New York.

Washington—Bids will be taken Nov. 6 by the bureau of supplies and accounts, navy department, for 1200 pounds of grade one, 2⅝-inch, round corrosion-resisting bar steel and 810 pounds of 3¼-inch. Bids will be taken Nov. 9 for 197,260 pounds of steel forgings for turbine rotors.

Plates

Plate Prices, Page 54

Philadelphia—Final award of approximately 565 tons of plates and bars by the navy, on which bids were opened Aug. 28, is considered significant by sellers. Were the navy expecting concessions at the opening Nov. 2 on close to 4000 tons of steel, principally plates, it would not have placed this tonnage after considerably delay that has been experienced, it is contended. Steel producers see in this distribution a decided change in the attitude of navy buyers.

The distribution last week, all under schedule 3099, follows: 235 tons, to Jones & Laughlin Steel Corp., Pittsburgh; 205 tons to Joseph T. Ryerson & Sons Inc., Chicago; 80 tons Carnegie Steel Co., Pittsburgh; 25 tons to Crucible Steel Co. of America, Pittsburgh; and 18 tons to Bethlehem Steel Co., Bethlehem, Pa. This was all black steel. A small tonnage of galvanized steel was placed elsewhere, with another small tonnage still pending.

A fair tonnage of plates has recently been placed by a large electrical company, some for stock and some for turbine work for the navy. Miscellaneous buying as a whole is slightly better, but there is still a notable absence of railroad buying. Plates are unchanged at 1.90c, Coatesville, Pa., or 1.98½c, delivered, Philadelphia.

Pittsburgh — More activity is shown in plates, mainly for river barges. Last week inquiry appeared for 24 standard coal barges for a Chicago interest, and West Kentucky Coal Co. promised to close on five, seven or ten standard coal barges around Nov. 15. Campbell Transportation Co., Pittsburgh, is buying eight coal barges and five down-river units. Furthermore, inquiries from gasoline concerns for units to transport fuel from Gulf ports into this district are promising. Last week Victor Brewing Co., Jeanette, Pa., after taking alternate bids on steel and aluminum tanks, purchased 17 low-pressure storage tanks, each 10½ feet in diameter by 15 feet long from Aluminum Co. of America, and 20 high-pressure glass-lined tanks from A. O. Smith Corp., Milwaukee. A tank for New Cumberland, W. Va., is pending, as is oil-storage capacity for Sun Oil Co. at a terminal planned for Kenova, W. Va.

Cleveland—A more hopeful view of market prospects prevails among sellers, but purchases remain small. Keen competition is noted among tank builders for the few projects coming out. A strike at an Akron, O., fabricator's plant has interrupted production there for the past week. The Cleveland mill resumed production with a light schedule late last week.

Chicago — Plate orders are small individually and buying is retarded by the low rate of consumption in several industries. Railroads and equipment builders are taking little material and requirements of tank fabricators generally are light. Little improvement in railroad needs is in early prospect, with a large portion of future orders expected to develop from various public projects.

Boston—Plate demand has improved slightly, most business being in miscellaneous orders. Several hundred tons for water storage tanks and standpipes have been placed, including one at Barnstable, Mass. An oil company is also planning a small tank project at East Providence, R. I.

New York—The Erie is expected to issue plans this week for a ferry boat involving possibly 700 tons of steel, principally plates. About 400 tons of new oil work is pending with a fair tonnage placed for six tanks for the Colonial Beacon Oil Co., Albany, N. Y., with Chicago Bridge & Iron Works, Chicago.

San Francisco—Blaw-Knox Co. and Western Pipe Corp., Los Angeles, have been awarded 100 tons of plates for tunnel forms for Los Angeles. No

award has been made on 5800 tons of plates for the Los Angeles aqueduct, involving, also, 45,000 tons of reinforcing steel and several hundred tons of shapes.

Contracts Placed

1000 tons, six tanks for Colonial Beacon Oil Co., Albany, N. Y., to Chicago Bridge & Iron Works, Chicago.

300 tons, 600 feet of 34-inch discharge pipe, United States engineers, St. Louis, to Treadwell Construction Co., Midland, Pa.

230 tons, six tanks, Titanium Pigment Co., Sayreville, N. J., to Treadwell Construction Co., Easton, Pa.

200 tons, 700,000-gallon elevated steel water tank, Cape May, N. J., to Tippett & Wood, Phillipsburg, N. J.

200 tons, ten small pontoons for United States engineers, St. Louis, to Ingalls Iron Works Co., Birmingham, Ala.

150 tons, 10 full deck steel pontoons, 46 x 22 x 2 feet, eight inches, United States engineer, St. Louis, to Ingalls Iron Works Co., Birmingham, Ala.

110 tons, ten 15,000-gallon tanks, Plandome, N. Y., to Graver Tank & Mfg. Co., East Chicago, Ind.

100 tons, two boilers for state of Arizona, to unnamed interest.

Unstated tonnage, 200,000-gallon steel water tank, Barnstable, Mass., to Chicago Bridge & Iron Works, Chicago.

Unstated tonnage, water tower, North Jersey state school, Totowa, N. J., to Pittsburgh-Des Moines Steel Co., Pittsburgh, $7100.

Unstated tonnage, 20 high pressure glass-lined tanks for Victor Brewing Co., Jeannette, Pa., to A. O. Smith Corp., Milwaukee.

Contracts Pending

2500 tons, for 13 barges for Campbell Transportation Co., Pittsburgh.

1000 tons, metal work, Rye Patch dam, Lovelock, Nev.; bids Nov. 12.

700 tons, mooring barge for Solvay Process Co., New Orleans.

300 tons, elevated tank, 1,500,000 gallons, Batavia, N. Y.

Unstated tonnage, 300,000-gallon tank, Fort Leavenworth, Kans.; bids Nov. 2, constructing quartermaster, that post.

Unstated tonnage, steel oil barge, United States engineer, Norfolk, Va., Bethlehem Shipbuilding Corp., New York, low, $14,750; bids Oct. 19.

Sheets

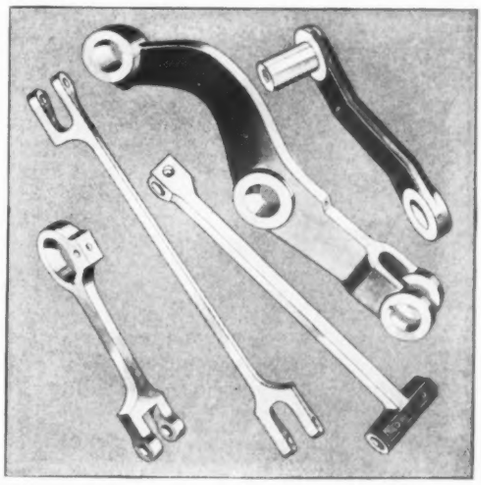
Sheet Prices, Page 54

Pittsburgh—Only occasional orders are being recorded. Many sheet buyers are visualizing the approach of year-end inventories, and are holding stocks to a minimum. Base prices are steady, with black sheets 2.40c, Pittsburgh; galvanized 3.15c, and No. 10 gage hot rolled 1.85c.

Cleveland—Reflecting a little better demand for sheets from automobile manufacturers, sheet mills in a nearby lake district are scheduled to resume operations this week after being down since the first week in October. The Cleveland mills, however, were idle last week, and schedules for this week are uncertain. Such business as is coming from the automobile industry is limited to small, trial orders for new models, or for rounding out stocks. Manufacturers of household equipment continue fairly active in the market; some good barrel tonnage was placed during the week.

General Electric Co., now operating its Erie, Pa., plant to capacity on the present refrigerator models will swing into production on 1935 models in November.

Chicago—Sheet demand continues to tend upward slowly, aided by a slight increase in automotive business as well as in orders from miscellaneous users. Some consumers who have been out of the market for several months have been forced to place new business because of stock depletion. With automotive



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companies approaching the commencement of work on new models, a sharper upturn in sheet buying is anticipated. Requirements of farm implement manufacturers show moderate gains.

Boston — Sheet buying continues light mainly in small lots for immediate delivery. Small tank, container and sheet metal working plants are generally taking requirements close to actual needs. There has been a slight gain in galvanized sheet demand for building and repairs.

New York—While sheet buying is spotty, there is a slight upward trend in demand. Business this month for most sellers will exceed that of last month. A number of buyers have virtually no stocks. A fair movement is noted in heavy gage sheets for oil burner tanks. Prices are steady.

Philadelphia—Demand from stovemakers is outstanding in the market. Sellers look for autobody tonnage in November, with possible improvement also in radio requirements. The bureau of weights and accounts, navy department, Washington, opens bids Oct. 26 on approximately 150 tons of steel, including sheets. Prices on all major grades are unchanged.

Cincinnati—Further improvement in demand for sheets developed during the week, considerable of the expansion being attributed to the automobile industry.

St. Louis—Farm implement makers have placed substantial orders, and specifications from that source are on a liberal scale. Stove interests also account for large quantities of sheets.

Transportation

Track Material Prices, Page 55

Passenger equipment activity reflects experiments with streamlined trains and diesel power units. Illinois Central has not closed on a streamlined train, for which it has issued specifications, nor on an inquiry for 11 diesel switching locomotives. St. Louis & San Francisco will air condition 26 coaches and two dining cars. The Santa Fe is considering purchase of a high-speed diesel locomotive for service between Chicago and the Pacific coast.

Norfolk & Western has issued an inquiry for 10,000 tons of 131-pound rails, understood to be for delivery early in 1935.

Anglo Mexican Petroleum Corp., 50 West Fiftieth street, New York, has placed 75 tank cars with General American Tank Car Corp., Chicago, and the Delaware River Bridge commission, Philadelphia, has inquired for 44 subway cars. Bethlehem Steel Co., Bethlehem, Pa., has booked 490 tons of rails for the federal bureau of reclamation, Kansas City, Mo.

A substantial car order for Canadian railways is said to be waiting approval of Premier R. B. Bennett on his return from Europe. If this order goes through it will be the first one for either railway for three years. Canadian Car & Foundry Co., Montreal, Que., and National Steel Car Corp., Hamilton, Ont., are said to be in line for portions of the business.

An order for 2500 tons of steel rails has been placed by the South African government with the Dominion Steel & Coal Corp., Montreal, Que. The rails are to be rolled at the corporation's plant at Sydney, N. S., for delivery Oct. 31, and work on the order will begin immediately. This is the second rail order placed with the corporation by the South African government in the last six weeks, the previous one calling for 12,000 tons.

Akron, Canton & Youngstown has applied to PWA for a $500,000 loan for the purchase of rails and fastenings.

With its PWA loan approved the Lehigh Valley is expected to bring out specifications shortly for 250 fifty-ton hoppers, 50 sixty-five-ton hoppers and three diesel electric locomotives.

Buses Placed

Chicago Motor Coach Co., Chicago, 75 double-deck buses to General Motors Truck Corp., Detroit.

Union Pacific, Omaha, twenty 29-passenger buses, about 10 tons steel, to White Motor Co., Cleveland.

Car Orders Placed

Anglo Mexican Petroleum Corp., 50 West Fiftieth street, New York, 75 tank cars, to General American Tank Car Corp., Chicago.

Rail Orders Placed

Federal bureau of reclamation, Kansas City, Mo., 490 tons of rails, to Bethlehem Steel Co., Bethlehem, Pa.

Car Orders Pending

Delaware River Bridge commission, Philadelphia, 44 subway cars.

Rail Orders Pending

Norfolk & Western, 10,000 tons, 131-pound rails; inquiry issued.

Pipe

Pipe Prices, Page 55

New York—An original filing of prices has been made on square and rectangular pipe at Gary, Ind., effective Nov. 5 with $93 for carlots, and $95 for less-carlots. This classification formerly was handled as an extra. On seamless round automotive tubing prices have been filed for Pittsburgh and Canton, O., effective Nov. 2 and for Shelby, O., effective Nov. 4. These prices, however, represent no change in base but rather a change in spread of the sizes affected.

Approximately 5000 tons of steel pipe may be required for piling for the federal post office here, bids opening Nov. 9; steel caissons are asked as an alternate. About 600 tons of miscellaneous steel pipe will be required for interior lines.

Cast pipe buying is limited to small lots. Inquiry is also light, although close to 3500 tons is expected out for a Westchester county city about Nov. 15. Washington closes this week on 350 tons.

Pittsburgh — Frederick Snare Corp., New York, is low bidder on general contract for the Tygarts river reservoir near Grafton, W. Va., at $6,249,423. This job will take 478 tons of 3-inch standard pipe, 42 tons of ½-inch galvanized pipe and 35 tons of 1½-inch galvanized pipe. Otherwise demand for pipe is fair but spotty. Seamless pipe demand is about 10 to 15 per cent ahead of September and is made up of fair size boiler tube orders for ships and railroad locomotive repairs.

Chicago—Cast pipe orders are light but a fairly large number of municipalities in southern Illinois are expected to close on inquiries in the near future. In addition a substantial tonnage is involved in pending work in other districts; a fairly large portion of this is expected to be awarded provided negotiations both locally and at Washington are overcome. Recent awards include 800 tons for Benld, Ill., and 175 tons for Lake Forest, Ill.

Boston—Cast pipe buying in small lots has increased with bids in on approximately 800 tons, including close to 275 tons for Somerville, Mass. Natick, Mass., placed 200 tons with the Florence, N. J., foundry. Purchasing of material for relief work is expected to continue well into late fall and winter providing laying conditions are possible.

Philadelphia—Miscellaneous steel pipe business shows moderate improvement, with a resultant increase

in the buying of skelp, including one lot of approximately 225 tons.

Birmingham, Ala.—Prospects continue fair but actual business is small. Operations are unchanged.

San Francisco—Few new projects taking cast or steel pipe have developed. The largest pending tonnage is 7469 tons of cast pipe for San Francisco. Week's awards were topped by 1040 tons for Phoenix, Ariz.

Seattle—Plans are completed for submitting to the government the $200,000 Howard Flat irrigation project at Chelan, Wash., requiring 1800 feet of 30-inch pipe.

Cast Pipe Placed

1040 tons, Phoenix, Ariz., to American Cast Iron Pipe Co., Birmingham, Ala.
800 tons, Benld, Ill., to United States Pipe & Foundry Co., Burlington, N. J.
653 tons, 4 to 8-inch, class 150 and 250, Oakland, Calif., to National Cast Iron Pipe Co., Birmingham, Ala.
175 tons, 20-inch, Lake Forest, Ill., to James B. Clow & Sons, Chicago.

Cast Pipe Pending

375 tons, 6 and 8-inch, water system, Murfreesboro, N. C.; Spoon & Lewis, Greensboro, N. C., engineers; bids Nov. 2.
350 tons, 12-inch, 3000 feet for 250-pound pressure and 4600 feet, 150-pounds pressure, Washington; bids Oct. 31.
275 tons, mainly 12-inch, Somerville, Mass.; bids in.
225 tons, 24 and 30-inch, Beverly-Salem, Mass.; bids in.
215 tons for Pageland, S. C.; bids Nov. 1.
105 tons, 6300 feet of 6-inch, water supply system, Central, S. C., Hardwood Beebe Co., Spartansburg, S. C., engineers; bids Oct. 30.
100 tons, filtration system, Weymouth, Mass.; bids in.

Steel Pipe Pending

555 tons, comprised of 478 tons 3-inch standard pipe, 42 tons ½-inch galvanized pipe and 35 tons 1½-inch galvanized pipe; Tygarts river reservoir dam, near Grafton, W. Va., Frederick Snare Corp., New York, low on general contract at $6,249,423.

Cold Finished

Cold Finished Prices, Page 55

Pittsburgh — Purchases of cold-drawn carbon bars by agricultural implement manufacturers continue fairly active. Orders from automotive centers are momentarily expected. The market is firm at 2.10c, Pittsburgh, on carbon bars, and at 2.95c, Pittsburgh on alloy cold-drawn.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 55

Recent price reductions in nuts and bolts and hexagon cap and square head set screws have not caused an expansion in volume, but have tended to spread the number of orders; some leading makers who were the last to recognize price concessions now find business returning.

Inquiries for bolts, nuts and rivets from Chevrolet, Chrysler and Pontiac feature the bolt, nut and rivet market at Detroit. These inquiries are for requirements into 1935 and promise to be closed within a few days.

Meanwhile, farm implement makers are fairly busy, but jobbers and railroads are making few bolt and nut commitments. The recent price reduction has in a sense unsettled the market, although on the other hand, prices are more uniform at the revised 70-10-10-10 off list basis. No change has occurred in large rivets, remaining 2.90c, Pittsburgh or Cleveland and 3.00c, Chicago.

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Shapes

Structural Shape Prices, Page 54

Youngstown, O. — Youngstown Sheet & Tube Co. has awarded to Fort Pitt Bridge Works, Pittsburgh, 3000 tons of structural shapes for a cold-rolled strip mill building to be erected at the Campbell, O., works. The mill equipment contract has been awarded to the Mesta Machine Co., Pittsburgh.

Boston—For the parcel post building, Boston, 8500 tons have been tentatively placed, with the general contract expected to go to the low bidder. Awards also include 400 tons for a store at Boston and a hospital building, Worcester, Mass. Bids close this week on a 400-ton bridge at Boston, but there has been a decline in new active inquiry.

Pittsburgh—Fabricating shops are interested in the 1200-ton Leechburg, Pa., bridge for the state, closing Nov. 2. Plans are proceeding steadily on Allegheny county bridges for which a federal loan recently was granted, and some fabricators believe that bids may be asked on portions of the projects within three to four months. Plain structural shapes hold at 1.80c, Pittsburgh.

Cleveland—E. I. du Pont de Nemours Inc., Wilmington, Del., which recently has been expanding its plant facilities in several cities, notably with 2800 tons for a pigment factory in Edgemoor, Del., placed 250 tons last week for remodeling its Toledo, O., works. Small industrial projects again were conspicuous in the market. Fabricators are figuring on 1000 tons for the Buffalo police station and 600 tons in five railroad bridges in Erie county, New York. Information from the Ohio state highway department is to the effect it will release some highway projects each week over the remainder of the year.

Chicago—Fabricators are figuring only a few small jobs, most pending projects being public bridges. Changes in specifications have delayed the issuing of plans for the Mississippi river dam at Winona, Minn., but these are expected shortly. Plans for the Muscatine, Iowa, dam are to be issued sometime in November. New inquiries are lacking in this district, one exception being 200 tons for a Springfield, Ill., bridge. Detroit has placed 240 tons of piling.

New York—For a jail and hospital in New Jersey, approximately 5500 tons of shapes are active, bids being in on the former. New inquiry, however, is slack while awards are limited to small tonnages, including several bridges. Another Hudson river pier, New York, taking several thousand tons, is being planned.

Philadelphia — Structural activity is tapering off here. Steel awards are expected this week for the Delaware river bridge work, the general contract having recently been let. Bids will be opened this week on possibly 800 tons for a government aircraft plant here. Shapes are 1.90c, Bethlehem, Pa., or 2.00½c, Philadelphia.

San Francisco—Bids on contracts No. 4 and 5 of the Golden Gate bridge, San Francisco, requiring in all 8810 tons of structural shapes, will be called for soon. Only two structural awards of size were noted here during the week, 500 tons for the San Jose, Calif., auditorium, and 350 tons for two substations at Pearl Harbor, T. H.

Seattle, Wash.—Low bid for the Coulee bridge over the Columbia river, this state, was submitted by J. H. Pomeroy & Co., San Francisco, and it is understood the Pacific Car & Foundry Co. will fabricate the 1500 tons of shapes if the contract is confirmed by the bureau of reclamation.

Shape Contracts Placed

3000 tons, cold-rolled strip mill building, Youngstown Sheet & Tube Co., to Fort Pitt Bridge Works, Pittsburgh.

2500 tons, superstructure of bridge over Lake of Ozarks, Camden county, Missouri, to Stupp Bros., Bridge & Iron Co., St. Louis, on low bid of $329,930.

1400 tons, bridge, Kansas City, Mo., to Kansas City Structural Steel Co., Kansas City.

1275 tons, Kensington high school, Buffalo, to Buffalo Structural Steel Co., Buffalo.

540 tons, bridge, federal aid project, Baltimore, to American Bridge Co., Pittsburgh; Northeastern Construction Co., Baltimore, general contractor.

520 tons, state highway bridge, Golden Ring, Md., to American Bridge Co., Pittsburgh.

500 tons, auditorium, San Jose, Calif., to Pacific Coast Steel Corp., San Francisco.

410 tons, bridge, NRH 155-D, Springer, N. Mex., to American Bridge Co., Pittsburgh.

360 tons, state highway bridge, Watrous, N. M., to American Bridge Co., Pittsburgh.

350 tons, two substations, Pearl Harbor, T. H., to unnamed interest.

335 tons, bridge, spans and beams, Las Vegas, N. Mex., to American Bridge Co., Pittsburgh.

335 tons, piling, Rehobeth Beach., Del., 225 tons to the Kalman Steel Corp., Bethlehem, Pa., and 110 tons to Carnegie Steel Co., Pittsburgh; through Colin Construction Co., Trenton, N. J., general contractor.

310 tons, building, I. J. Fox Co., Boston, to New England Structural Steel Co., Everett, Mass.

300 tons, Wheeler dam, Knoxville, Tenn., to Mississippi Valley Structural Steel Co., Decatur, Ill.

300 tons, bridge, Roscoe, Nebr., to McClintic-Marshall Corp., Bethlehem, Pa.

250 tons, plant remodeling, Toledo, O., for E. I. du Pont de Nemours Inc., Wilmington, Del., to McClintic-Marshall Corp., Bethlehem, Pa.

240 tons, piling, Detroit sewer work, to Inland Steel Co., Chicago.

225 tons, piling, Montgomery, Ala., to Virginia Bridge & Iron Co., Roanoke, Va.

225 tons, powerhouse, United States Alcohol Co., Curtis Bay, Md., to McClintic-Marshall Corp., Bethlehem, Pa.

215 tons, bins, Titanium Pigment Co., Satreville, N. J., to Treadwell Construction Co., Easton, Pa.

200 tons, piling, Bethany Beach, Del., through W. P. Short, general contractor, Bethany Beach, to Jones & Laughlin Steel Corp., Pittsburgh.

190 tons, state highway bridge, Arcade, N. Y., to Ernst Iron Works Inc. Buffalo.

165 tons, brewery building, Utica, N. Y., to Ernst Iron Works Inc., Buffalo.

150 tons, bridge, project 348-B, Georgia, to Taylor Iron Works & Supply Co., Macon, Ga.

150 tons, hangar in Washington for Goodyear Tire & Rubber Co., Akron, O., to Austin Co., Cleveland.

140 tons, factory building, J. M. Lehman Co., Lyndhurst, N. J., to Salbach-Meyer Co., Union City, N. J.; Brown & Matthews Co., general contractor.

140 tons, bridges, Anne Arundel and Prince George counties, Maryland, to Roanoke Bridge & Iron Co., Roanoke, Va.; Maryland Engineering & Construction Co., Baltimore, general contractor. Dietrich Bros., Baltimore, awarded 40 tons of reinforcing bars.

140 tons, outlet tunnel steel, Chama, N. Mex., for Middle Rio Grande conservancy district, to American Bridge Co., Pittsburgh.

135 tons, dormitory, Chelsea, Mass., for Massachusetts soldiers' home, to New England Structural Co., Boston.

135 tons, state highway bridge, Irving-Gowanda, Erie county, New York, to R. S. McManus Steel Construction Co., Buffalo; John Tata, Buffalo, general contractor.

125 tons, bridge for Missouri Pacific railroad, Fort Worth, Tex., to Virginia Bridge & Iron Co., Roanoke, Va.

118 tons, state highway bridge RC 3576, Greene county, New York, to Lackawanna Steel Construction Corp., Buffalo; William Van Kleeck, New Paltz, N. Y., general contractor Albany Steel & Iron Co., Albany, awarded small tonnage of reinforcing bars.

112 tons, ward building, Belmont hospital, Worcester, Mass., to United Structural Steel Co., Worcester; M. S. Kelliher Co., Boston, general contractor. Truscon Steel Co., Youngstown, O., awarded 46 tons of reinforcing bars.

110 tons, building, Meyer Dairy Products

Shape Awards Compared

	Tons
Week ended Oct. 27	14,183
*Week ended Oct. 20	13,043
Week ended Oct. 13	15,481
This week in 1933	22,075
Weekly average, 1933	9,296
Weekly average, 1934	16,597
Weekly average, September	12,154
Total to date, 1933	628,460
Total to date	730,262

*Revised

Co., Cleveland, to Republic Structural Iron Works, Cleveland.

108 tons, high school, Alexandria, Va., to Dietrich Bros., Baltimore; Doyle & Russell Co., Richmond, Va., general contractors. Unstated tonnage of bars awarded to Truscon Steel Co., Youngstown, O.

100 tons, school, Rumson, N. J., to Maxwell, Spiro & Co., Jersey City, N. J.

Shape Contracts Pending

8500 tons, superstructure, parcel post building, Boston; Great Lakes Construction Co., low for general contract, and steel reported provisionally awarded.

7500 tons, contract No. 4, Golden Gate bridge, San Francisco; bids soon.

4000 tons, tuberculosis hospital, Jersey City, N. J.; bids Nov. 8.

2060 tons, including 400 tons of piling, and 1660 tons of miscellaneous steel fabricated work, dam at Gallipolis, O.; bids to United States engineers, Huntington, W. Va., Nov. 20.

1500 tons, Coulee dam bridge, Columbia river, Washington; J. H. Pomeroy & Co., San Francisco, low.

1500 tons, Oklahoma state highway bridges.

1500 tons, jail buildings, Bordentown, N. J.; bids in.

1310 tons, contract No. 5, Golden Gate bridge, San Fransico; bids soon.

1250 tons, state bridge over Red river, Rapides parish, Louisiana; contract No. 4, bids Nov. 14.

950 tons, police headquarters building, Buffalo; bids Nov. 9.

963 tons, state bridge over Red river, Rapides parish, Louisiana; contract No. 3, bids Nov. 14.

825 tons, psychopathic ward, general hospital, San Francisco; bids opened.

825 tons, Delaware river bridge commission, Philadelphia; E. R. Morehouse Co., Camden, N. J., awarded general contract, with steel contract expected to be announced shortly.

670 tons, state bridge, Ottawa county, Oklahoma; bids in Oct. 23.

600 tons, apartment building, New York, for Jasco Realty Corp., New York.

540 tons, state bridge, Osage county, Oklahoma; bids in Oct. 23.

300 tons, ornamental work, federal building, New York; bids Nov. 9.

250 tons, track shed and carbarn, Washington, for Capitol Transit Co., Washington; bids taken Oct. 23.

250 tons, hangar, specification 7770, Pearl Harbor, T. H.; bids Nov. 14.

250 tons, Diablo dam powerhouse, for Seattle; Rumsey Construction Co., Seattle, contractor.

240 tons, three small state bridges, scattered locations, Minnesota.

200 tons, state bridges, Springfield, Ill.; bids Nov. 1.

200 tons, school addition, Wellesley, Mass.; D'Armore Construction Co., Boston, low, but bid is above appropriation.

175 tons, bridgewall, Brooklyn, N. Y.

125 tons, two traveling cranes, specification 1530, Los Angeles; bids Nov. 2.

122 tons, state bridge, McCurtain county, Oklahoma; bids in Oct. 23.

Unstated, science hall, Washington state college, Pullman, Wash.; Ross B. Hammond Co., Portland, general contractor.

Reinforcing

Reinforcing Bar Prices, Page 55

Pittsburgh—Contingent upon the general contract award going to Frederick Snare Corp., New York, for the construction of the Tygarts river reservoir dam near Grafton, W. Va., this low bidder will purchase 945 tons of reinforcing steel, mainly rail steel bars, as well as miscellaneous lots of mesh and expansion joints. Pennsylvania state highway work covering reinforced concrete paving in Berks, Lackawanna and Montgomery counties will be bid to the secretary of highways, Harrisburg, Pa., Nov. 9.

Cleveland—Bids on the first three dams in the Muskingum, Ohio, conservancy project will be taken early in November, requiring 500 tons of concrete bars, and several hundred tons of structural shapes. This week the Ohio highway department, Columbus, opens bids on several road projects, taking 250 tons. In Cleveland, demand is restricted to occasional small lots for miscellaneous industrial work.

For the Lorain avenue bridge over Rocky river, Cuyahoga county, Ohio, on which the state highway commission will take bids Nov. 16, 250 tons of reinforcing bars will be required, in addition to 2000 tons of shapes.

Chicago—Concrete bar orders and inquiries recently have been smaller than during the preceding several weeks although fairly large tonnages still are pending, principally for various public projects. The latter include road work as well as several dams in this district and the Far West. The second portion of the government's $25,000,000 housing program in Chicago will be started soon, condemnation proceedings for the south side portion involving $7,000,000, having been filed.

Boston—Reinforcing bar demand is fairly active with 480 tons placed for prison buildings, Norfolk, Mass. Close to 500 tons pend for the parcel post building, Boston, and several hundred tons of new business are up for highways and bridges in Connecticut on which bids are in.

New York—Delivered prices for highway mesh have advanced 1.50c to 2.00c a square yard, depending on location of the work, the increase applying on both New York and New Jersey purchases. In the latter state

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550 tons for highways has been placed. Several hundred tons on which general contract bids are in are active in New York state. Billet bars are sluggish with prices unchanged, cut lengths delivered to the job being 2.48c.

Washington—Bureau of reclamation, department of interior, will take bids Nov. 12 at Lovelock, Nev., for the following materials and installations for the Humboldt dam project: 350 tons of reinforcing bars; 250 tons of steel piling; furnishing and installing 81 tons of tunnel liner plates; and installing 175 tons of gates and other metal work.

San Francisco—The metropolitan water district, Los Angeles, has awarded the general contracts for 110 miles of aqueduct, requiring 45,000 tons of reinforcing bars, 5800 tons of plates and 750 tons of shapes. The estimated cost of the project is $35,000,000. Material is expected to be purchased shortly. Concrete bar awards during the week in California aggregated 877 tons, including 400 tons for an auditorium in San Jose.

Reinforcing Steel Awards

550 tons, highway, route 10, section 5, Salem street to Succasunna, Morris county, New Jersey, to Truscon Steel Co., Youngstown, O.; George M. Brewster & Son Inc., general contractor.

400 tons, auditorium, San Jose, Calif., to Soule Steel Co., San Francisco.

480 tons, industrial buildings A and D, state prison colony, Norfolk, Mass., to Morrison-Stevens Co., Boston; M. Spinelli & Sons, Boston, general contractors.

170 tons, printing office building, San Francisco, to Soule Steel Co., San Francisco.

150 tons, high school, Hamden, Conn., to Topper & Griggs, Hartford, Conn.; Industrial Construction Co., Hartford, Conn., general contractor.

150 tons, water development, Reading, Pa.; awarded through Whiting Turner Co., Baltimore, general contractor, to the Concrete Steel Co., Philadelphia.

135 tons bridge, federal-aid project, Baltimore, to American Steel Engineering Co., Philadelphia; Northeastern Construction Co., Baltimore, general contractor.

100 tons, Pennsylvania railroad grade elimination, Elmira, N. Y., to Truscon Steel Co., Youngstown, O.; through Sinclair and Driggs, Philadelphia, general contractors.

100 tons, Mausoleum, Ontario, Calif., to unnamed interest.

Reinforcing Steel Pending

1100 tons, George Washington high school, San Francisco; general contract to Meyer Construction Co., San Francisco.

900 tons, Tygarts river reservoir dam near Grafton, W. Va.; Frederick Snare Corp., New York, low an general contract at $6,249,423 on bids of Oct. 23 to Pittsburgh federal engineers.

408 tons, state bridge, Rapides parish, Louisiana; contract No. 2 bids Nov. 14.

250 tons, Lorain avenue bridge over Rocky river, Cuyahoga county, Ohio; bids to state highway commission Nov. 16; 2000 tons of shapes also will be required for this project.

200 tons, ungalvanized steel wire strand, United States engineer, Vicksburg, Miss.; bids in Oct. 23, schedule 87.

168 tons, state bridge, Rapides parish, Louisiana; contract No. 3 bids Nov. 14.

150 tons, state highways, Connecticut; bids Nov. 5.

145 tons, terminal improvement, Fayetteville, N. C., being financed through PWA; J. C. Bowers, Whiteville, N. C., low on general contract, and J. A. Reed Construction Co., Birmingham, Ala., second low. Low bidder is understood to have filed application to withdraw bid.

125 tons, jail buildings, Bordentown, N. J.; Pellecchia Construction Co. low.

Unstated tonnage, addition to naval aircraft building, Philadelphia; design changed from structural steel to reinforced concrete.

Strip Steel

Strip Prices, Page 55

Pittsburgh — Increasing commitments for hot and cold-rolled strip steel are coming from a varied line of consumers, which is encouraging considering the light buying of the automotive industry. Several hardware makers have been fair takers of cold strip, and a few stamping shops have bought more heavily in hot-rolled. There is evidence that consumers' stocks are being worked off. On a Pittsburgh basis, hot-rolled strip prices are at 1.85c and cold-rolled 2.60c.

Cleveland—Some rush shipments of cold rolled strip for experimental work on new models were specified here last week, but generally automobile tonnage continued light. Mill interests appear reconciled to another week or two of waiting before substantial business develops from the automobile industry. Miscellaneous strip requirements sustain mill operations here around 25 per cent.

Chicago—With only small lots of automotive strip orders being received, progress toward better operations is low. The outlook for the next several weeks is more favorable, however, since additional automotive buying is in prospect and more miscellaneous users, because of low stocks, are being forced to reenter the market. Buying is for prompt needs and orders usually involve only small lots.

Boston—Cold-rolled strip specialty demand holds, but in regular lines mills are meeting keen competition from sheet jobbers, consumers substituting sheets for strip in numerous instances. Mill operations continue erratic, due to the wide variety of small mixed orders.

Philadelphia — Although spotty, strip tonnage is a little more active, with hot strip holding 1.85c, Pittsburgh, or 2.14c, Philadelphia, and cold strip 2.60c, or 2.89c.

Concrete Awards Compared

	Tons
Week ended Oct. 27	2,235
Week ended Oct. 20	3,531
Week ended Oct. 13	4,740
This week in 1933	3,885
Weekly average for 1933	3,232
Weekly average, 1934	4,546
Weekly average, September	2,604
Total to date, 1933	156,644
Total to date, 1934	200,039

Wire

Wire Prices, Page 55

Pittsburgh — Continued prevalence of small orders for nails, manufacturers' wire, fence and galvanized wire continue, but do not engage wire producing capacity at much over 25 per cent. Jobbers' requirements seem to be almost entirely fill-in. The official schedule on nails at $2.60 per keg, Pittsburgh, on plain wire at 2.30c and on fence wire at 2.45c for annealed and 2.80c for galvanized, continues to be quoted. Wovenwire fencing is $63 per base column, in carload lots. The less-carload order in wire products continues to predominate.

Cleveland—Demand for manufacturers' wire is holding fairly steady, small lots being purchased during the week, with the total slightly larger than in the preceding week. Nut and bolt manufacturers are giving more attention to automobile requirements, and wiremakers are encouraged by the outlook for November volume. The market for nails is quiet.

Chicago—Occasional betterment is noted in demand for wire and wire products and October is expected to show a small gain over September. Purchases by jobbers, while still spotty, are slightly heavier and there is a small gain from the automotive industry.

Boston — Improvement in demand for wire has been due to depleted consumer stocks, but gains have been slight on both standard material and specialties. Mill operations are not materially changed.

New York—High carbon spring wire has been reduced $6 per ton, effective Nov. 4, to 2.90c, Pittsburgh and Cleveland, 2.95c, Chicago, 3.00c, Worcester, and 3.35c, Pacific coast

ports. According to the trade this reduction is to meet a special situation and does not indicate general weakness.

Philadelphia — Wire sellers continue to express disappointment over the volume of current specifications. Manufacturers' requirements are small and consumption of nails for seasonal building repairs is falling short of expectation.

Pig Iron

Pig Iron Prices, Page 56

Pittsburgh — Fair activity continues in foundry pig iron, with radiator plants making commitments in lots up to 500 tons. A steel mill equipment builder is understood to have purchased about 2000 tons of foundry iron. Advanced prices in the scrap market soon may divert some melters' purchases to pig iron.

Cleveland—Some melters who had not purchased iron since last spring have re-entered the market. Average size of orders has increased slightly, though total bookings still are unsatisfactory for this time of the year. October shipments now are 85 per cent larger than those in September. Prices are steady.

Chicago — Gain in pig iron shipments of some sellers this month compared with September ranges as high as 50 per cent. Sales of small prompt lots are more numerous. Foundry operations, while irregular are definitely improved, with automotive plants gradually increasing production. Farm implement and stove foundries continue active. No. 2 foundry and malleable continue $18.50, furnace.

Boston — Sales of pig iron again have slumped. Buying is in small lots, often truck deliveries. Larger consumers, notably textile machinery foundries, are not active. Increase of the differential on low silicon foundry iron, 1.75 per cent or under, from 25 to 50 cents, will apply on considerable iron stored nearby.

New York—Pig iron orders are somewhat more numerous with small lots the rule. The Troy, N. Y., furnace continues in operation despite recent rumors it had been banked.

Buffalo—Melt of pig iron is increasing, especially in radiator works. Small lot buying and inquiry have improved. One merchant furnace has gone out but a steelworks furnace has been lighted, restoring the active units to four. Fair quantities of iron are being shipped by canal and lake prior to the close of navigation. One large order for spot lake iron was received this week.

Philadelphia—In addition to 100 tons reported here recently, another small lot of Russian iron, presumably for trial purposes, has been bought. Pig iron demand generally is restricted, though specifications for the month now closing are improved over September. Navy will open bids Oct. 26 on 150 tons of low phosphorus iron.

Cincinnati—Although melters still are buying for early needs only, tonnage of pig iron sales is heavier. This trend may be due more to exhaustion of some inventories than an increase in the melt. Shipments are better. Stove foundries continue to present the best market in the district.

St. Louis—Shipments continue in large volume, and new buying represents a fair aggregate, but is in small, scattering lots for prompt delivery. Stove, range and heating apparatus manufacturers continue to lead in activity.

Birmingham, Ala.—With exception of demand from cast iron pipe foundries, prospects in the pig iron market are not considered bright, and production is being further curtailed.

Seattle—Sales have improved, although foundry activity is restricted to plants manufacturing specialized machinery and equipment. Prices are unchanged.

Toronto, Ont.—Business in merchant pig iron is showing improvement. Current demand is confined largely to single cars, with an occasional lot up to 200 tons. New inquiries denote heavier buying later.

Ferroalloys

Ferroalloy Prices, Page 56

Ferromanganese specifications for the month so far have been at a better rate than in September, reflecting the small gain in steelmaking operations. Ferromanganese is unchanged at $85, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, is $26, furnace, on lots up to 50 tons, and $24 on 50 tons and over.

Coke By-Products

Coke By-Product Prices, Page 55

New York—Demand for naphthalene is limited to spot shipments for fill-in requirements. Prices are unchanged. Industrial demand for phenol holds fairly well, with the recent rate of shipments to the drug trade unchanged. Distillate prices are firm with current output going directly into consumption. Sulphate of ammonia is unchanged and in steady demand.

Quicksilver

New York—Quicksilver prices are steady but demand is quiet. Small lots are $74.50, a virgin flask of 76 pounds, and round lots down to $73.50.

Wire

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Scrap

Scrap Prices, Page 57

Pittsburgh—Participation of two district mills in scrap purchases last week found the first paying $10.75 per ton for several thousand tons of No. 1 heavy melting steel and following closely thereon, the other was forced to pay $11.25 for about the same tonnage. Therefore, in a week the market increased 75 cents a ton and became quotable at $10.75 to $11.25. This is the first advance in the scrap market since the middle of last May, and with the change, hydraulic compressed sheets, scrap rails and steel specialties firmed up. However, weakness continues in blast furnace scrap.

Cleveland—Steel and iron scrap prices are marking time in this area. Some open-hearth and blast furnace material is moving in small lots. Foundries are taking little cast scrap.

Chicago—Scrap has a stronger tone here despite absence of purchase by mills. Prices bid on heavy melting steel on recent lists of the Chicago, Burlington & Quincy and Santa Fe reveal a fairly substantial increase over figures named on previous lists. Heavy melting steel continues $8.50 to $9. Scrap output by miscellaneous producers is rather light but this is matched by quiet demand. Short shoveling turnings are stronger on purchases for dock delivery. A boatload of light scrap is scheduled to start eastward this week.

Boston—With heavier buying for export at prices well above those New England or other domestic consumers will pay, activity in scrap is confined largely to purchasing for foreign shipment. With additional volume booked, more than 20,000 tons will have been exported by the middle of next month most for Great Britain.

New York—Scrap buying continues largely for export at unchanged prices, although slightly more interest has been displayed by one or two eastern domestic consumers. Several thousand tons went to Harrisburg, Pa., breakable cast and stove plate, $9.50, delivered, being paid for the former. Better sentiment exists with prices firm. Breakable cast and specification pipe are up 25 cents a ton.

Philadelphia—While the major grades are moving slowly, there has been some gain in buying of scrap specialties, and in the case of steel shafting there has been an increase to $16, delivered, which is contrary to the general trend. This increase in the shafting price is explained by the fact that the low market for scrap generally has curtailed dismantling operations, with a resultant scarcity in shafting.

Buffalo—Scrap is moving to most steelworks at a fair rate. An offer of $9.50 for No. 1 melting steel is resulting in some small contracts being made but off-grade material subject to deductions is being largely delivered on these contracts, it is claimed. Foundry scrap is moving in small lots. Recent purchases of blast furnace scrap are believed to have been terminated. Prices are steady. Considerable quantities of turnings and borings have been brought to local consumers from Detroit.

Detroit—Scrap prices are unchanged, with few signs of definite strength. At the same time production by automotive interests is light and this helps to maintain prices. October is expected to be the low month as regards scrap production but light output is matched to a certain extent by quiet in mill requirements.

Cincinnati — The iron and steel scrap market is quiet. Almost all tonnage on orders has been shipped. Quotations are nominal.

St. Louis—The prolonged dullness in iron and steel scrap remains unbroken, and the downward trend in prices continues. Meanwhile trading is on a low scale, consisting chiefly of small tonnages for prompt shipment. While prices are admittedly low, no one is taking advantage of that fact for investment or speculative purposes.

Birmingham, Ala.—Steel and iron scrap continue dull, heavy melting steel is at $8 with little moving. Railroad offerings are light as the price is not attractive.

Seattle—The Oriental market for scrap steel is slightly off due to scarcity of ocean space and fluctuations in the yen. Heavier sales are likely as quickly as conditions are adjusted. In the meantime exporting houses are seeking suitable tonnages. Asked prices are unchanged.

Toronto, Ont.—Trading in iron and steel scrap continues quiet. Special grades are in fair demand while the general grades have little call. Consumers are buying only as demands dictate. Demand for heavy melting steel and turnings continues practically at a standstill with only small tonnage lots going to the Hamilton mills. It is understood that the Dominion Steel & Coal Co., Sydney, N. S., is buying scrap, but mostly from United States points.

A survey of tin occurrences in Alabama, made through a PWA appropriation, results in finding that known tin-bearing deposits have slight if any commercial value.

Warehouse

Warehouse Prices, Page 58

Pittsburgh—Small warehouse steel orders predominate but aggregate a tonnage which will be ahead of September. For in-town Pittsburgh shipment, the official schedule on steel bars is 2.90c, and on shapes and plates, 3.15c. Cold finished steel is 3.45c, hoops 3.70c, bands 3.20c, and 10 gage sheets, 2.95c.

Cleveland — Warehouse interests report a little better feeling in the market, with sales during the week slightly larger than in the week preceding.

Chicago—Sales declined the past week after holding at a peak level for the preceding two weeks. Bolts and nuts have been reduced by an additional 10 point discount, in keeping with the recent revision in producers' prices.

New York—Warehouse volume in October is substantially better than the preceding month, the improvement being well spread among products. Prices are unchanged and steady on domestic products, but most imported materials are moving below listed quotations.

Philadelphia — Jobbing demand shows improvement over September, but has fallen short of seasonal volume. Prices are steady.

Cincinnati—Warehouse orders remain fairly even without much expansion in industrial demand. Building materials are inactive. Quotations are unchanged.

Seattle—The wholesale jobbing trade is dragging, pre-election hesitation and uncertainty being general. Sales are in small tonnages.

Nonferrous Metals

Nonferrous Metal Prices, Page 56, 57

New York—Prices in the nonferrous metal markets last week were generally steady with prime western zinc and tin established at higher levels. Demand for copper abroad was strong and the export price advanced sharply to a high of 7.00c, c.i.f. European ports.

Copper—Outlook for a meeting of foreign copper producers to discuss possible curtailment of output is considered much more favorable than it has been for months. Foreign sales during last week were large while those in the domestic market held at

the moderately better pace of the previous week. All factors seem to point to a stronger world market.

Zinc—Prime western prices were firmer at 3.85c, East St. Louis, despite light demand. Production of ore in the Tri-State district is expected to show an increase but curtailment for the remainder of the year may be effected.

Lead—Sales decreased but the tons of the market has held steady at 3.70c, New York, and 3.55c, East St. Louis. The September statistics showing a decrease of about 4000 tons in refined lead stocks in the United States strengthened the position of the market.

Tin—Sales of Straits were confined to only a few scattered lots. Prices advanced on the strength of the pound sterling against the dollar in foreign exchange markets. Spot closed around the 51.15c, New York, level.

Aluminum—Virgin metal continues to be available at around 19.00c a pound.

Antimony—Prices eased on Thursday to 9.37½c but the metal was quoted up to 9.50c, New York, for spot during the week.

Tin Plate

Tin Plate Prices, Page 54

Pittsburgh—Tin plate production continues at an average of 40 per cent, but early declines are expected. Though the government has contracted to preserve some 700,000 additional head of cattle, sheep and calves, existing containers in the hands of canmakers will care for this requirement and no additional tin plate will be needed. Negotiations are near at hand for 1935 contracts. Tin plate holds at $5.25, Pittsburgh.

Metallurgical Coke

Coke Prices, Page 55

Jones & Laughlin Steel Corp., Pittsburgh, has closed on furnace coke requirements for Pittsburgh Steel Co.'s blast furnace, recently blown in at Monessen, Pa., with shipments to be made by barge. However, the approaching domestic season has provided considerable demand for by-product and beehive coke oven operators. Metallurgical coke is moving in good volume to radiator foundries.

On a Connellsville, Pa., oven basis there has been no change in quotations on furnace or on foundry grades at $4.60, and $5.10 to $5.35, respectively, depending upon the grade.

Foundry coke shipments at Chicago are about 25 per cent heavier than in September and at Cincinnati a moderate increase in foundry coke buying is noted. Birmingham producers find demand is increasing.

Iron Ore

Iron Ore Prices, Page 56

Cleveland—Shipments of Lake Superior iron ore so far in October indicate a total of 2,400,000 tons for the month. This will raise the cumulative total for the year to Nov. 1 to 21,524,000 tons. The movement for the entire season of 1933 was 21,600,000 tons. More vessels are being dropped; 83 were engaged in the ore trade Oct. 15, compared with 115 on Sept. 15. Present schedules call for the shipment of 200,000 to 300,000 tons early in November, completing the season.

New York — Although foreign iron ore importations along the eastern seaboard are light, some substantial arrivals are scheduled soon for Hamilton, Ont., by way of Montreal. These will include several thousand tons of Rif ore from North Africa and several thousand tons of Spanish ore.

Semifinished

Semifinished Prices, Page 55

Tin plate rollers have reduced their semifinished requirements, and demand for sheet bars is declining. Several export inquiries for wire rods are promising, one mainly from Japan. Skelp and tube rounds are moving at a slow rate. The market is $28, Pittsburgh, for sheet bars; $27 for billets, and $38 for wire rods. Tube rounds are $36, and skelp $34 per ton.

Steel in Europe

Foreign Steel Prices, Page 58

London—(*By Cable*)—The British pig iron market continues active, and producers of hematite in the northeast are assured of steady operations for many weeks. Sales of finished steel are improving. A Middlesbrough steelmaker has booked 4000 tons of steel for a tanker for a South American interest. Steelworks in Scotland are operating full time. Sheetmakers find domestic demand is satisfactory but export inquiry is poor.

Slack domestic demand has brought enforced idleness to some French works. The German tube cartel has booked substantial contracts for delivery in British North India and the Dutch East Indies.

Men of Industry

(*Concluded from Page* 21)

waukee. He has been associated with the automotive radiator industry since 1908.

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Dr. E. R. Stoekle, vice-president

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and chief engineer of the Globe-Union Mfg. Co., has been elected president of the Engineers Society of Milwaukee, succeeding William D. Bliss, president of the Bliss Bros. Tool Co. Other new officers are: B. V. E. Nordberg, Nordberg Mfg. Co., vice-president; Walter R. Mueller, secretary-treasurer (re-elected); Walter Ferris, vice-president, Oilgear Co.; R. C. Newhouse, chief engineer, Allis-Chalmers Mfg. Co., and Dean F. A. Kartak, school of engineering, Marquette university, directors.

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W. S. Todd, salesman in the Cleveland office of Carnegie Steel Co., has been transferred to Toledo, O., as resident salesman.

A. G. Thorne, salesman at Toledo, O., for the Carnegie company, has been transferred to Pittsburgh.

Foster W. Lamb, salesman in the Pittsburgh district for Carnegie, has been moved to the Cleveland office.

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Dr. Hermann von Schrenk, a consulting timber engineer of St. Louis, has been formally elected president of the American Society for Testing Materials to succeed W. H. Basset, who died July 21. Dr. Schrenk has been vice president of the society.

Production

STEELMAKING production went down 1 point last week to 25½ per cent, due principally to a temporary shutdown of several open-hearth plants. Gains at Pittsburgh, Chicago, eastern Pennsylvania, Wheeling and Cleveland were offset by losses at Youngstown and Birmingham. It is expected, however, that the loss will be recouped this week as these open hearths are again put in operation. Details follow:

Youngstown—Down 4 points last week to 26 per cent, and the rate will rebound to 29 per cent at this week's start. Carnegie Steel Co. and Youngstown Sheet & Tube Co., will have all their open hearths on schedule.

Pittsburgh—Up 1 point last week to 21 per cent. A leading interest joined in the improvement by heavier schedules at two of its Pittsburgh divisions which had been closed the week previous. Independents were averaging slightly more than 21 per cent rate.

For this week, a slight decline to 20 per cent will become effective, owing to the temporary shutdown of two district open-hearth plants whose output is largely finished into bars. This shutdown is only temporary, and should be broken by next week. A district pipe producer has resumed with its bessemer department which had been closed for two weeks.

Fifteen out of 60 steel works blast furnaces are on here, as National Tube Co. resumed blast at its one McKeesport, Pa., stack which had been banked for two weeks. The other 14 furnaces active are split up as follows: Seven for Carnegie Steel Co., three for Jones & Laughlin Steel Corp., two for Bethlehem Steel Co., Johnstown, Pa., and one each for Pittsburgh Steel Co. and Pittsburgh Crucible Steel Co.

Chicago—Increased fractionally to 27½ per cent. While changes the past several weeks have been small, the current rate is the best in nearly two months, comparing with 27 per cent a week ago. Mills continue to operate eight of 36 steelworks stacks, with two merchant furnaces also active.

Wheeling—Advanced 6 points to 29 per cent last week. This week, operations will be up another 2 points to 31 per cent, when 12 out of 39 open-hearth furnaces in the district will be on schedule.

New England—Held at 40 per cent last week. Indications for this week are for a decline to about 30 per cent, due to one steel works taking off all open hearths.

Buffalo—Unchanged at 24 per cent last week. With the addition of one open hearth, the rate is expected to rise 2 points to 26 per cent this week. This rate will be maintained or possibly increased slightly during the next ten days.

Birmingham—Dropped sharply to 10 per cent last week, a loss of 15 points, due to a reduction in open-hearth furnace activity. No improvement is anticipated in the immediate future.

Detroit—Stationary at 59 per cent last week, with 10 out of 17 open hearths on schedule.

Central eastern seaboard—Up fractionally to 20 per cent, with little change indicated for this week.

Cleveland-Lorain—Up 7 points to 38 per cent, with the Corrigan, McKinney Steel Co. increasing the number of its active open hearths from four to six Oct. 26. Otis Steel Co. continued with two, and National Tube Co., Lorain, with eight. Corrigan, McKinney has scheduled a seventh open hearth to begin operations Monday, this week, raising the average for this district several points.

Institute

FIRST edition of a publication entitled *Steel Facts* has just been issued by the American Iron and Steel institute. An 8-page bulletin attractively compiled and amply illustrated with charts and tables, it contains statistics and other pertinent information of interest to the iron and steel trade. The issue, which may become a regular monthly feature, is being sent to members of the American Iron and Steel institute and of the steel code.

Equipment

New York—Machinery lists for two additional New York technical schools, the ordnance bureau for arsenal equipment and steady navy inquiry feature activity in machinery. Bids close Nov. 4 and 10 on equipment for the Samuel Gompers and Staten Island vocational schools, New York. Inquiry for private industrial plants is slightly improved, but buying is confined to one or two tools at a time. Equipment included in the bureau of ordnance opening of Nov. 19 and 20 includes, thread milling machines, vertical drills, horizontal hydraulic broaching machines, automatic screw machines, gear hobbing machinery, shapers, lathes and a large list of miscellaneous tools.

Boston—Slight improvement in inquiry and individual orders for machinery and equipment is noted. Shop operations, however, have gained but slightly. Ball bearing producers are fairly active with indications of some upturn in operations shortly. Textile mill equipment builders are operating below the rate of last year. Brown & Sharpe Mfg. Co., Providence, R. I., has been awarded navy orders totaling $27,557.84.

Pittsburgh—Patent controversies over 4-high mill design are delaying award of the 42-inch continuous hot strip mill for Carnegie Steel Co.'s McDonald, O., works. It developed last week that a further interpretation on the patents and licenses to build a 4-high mill design now hinge over whether the rolling unit is to be a single stand or of multiple stands. Reports credit a change in design of the prospective continuous mill for Great Lakes Steel Corp., Detroit, and some equipment builders understand that a hot steckel mill design may be decided upon.

Inquiry in the market continues to be promising with engineering, design and costs departments heavily engaged. Among prospective work is a 36-inch strip mill for the Carnegie Steel Co.'s Edgar Thomson works, but this improvement like many others for subsidiaries of the United States Steel Corp. promises to be delayed for lack of appropriation.

Chicago—Machinery and equipment markets are slow but although sales show little change compared with the rate of the past several months, sentiment is improved slightly and better markets are anticipated next year. Railroads are particularly apathetic toward equipment buying, the sole exception being the purchase of needed repair parts. Orders for parts from railroad shops have been considerably heavier than from other users due to the fact that such buying had been curtailed for several years while installations of new equipment also were limited.

Construction and Enterprise

New England

WASHBURN, ME.—Quebec Extension Railway Co., Quebec, Que., plans construction of electrified railway line from Washburn to Lac Frontier, on United States-Canadian boundary, about 90 miles, including feeder lines, power substations and switching stations to cost about $4,175,000.

PROVIDENCE, R. I.—Providence county has received PWA loan of $187,000 for East Smithfield water district for waterworks system.

New York

NORTH TARRYTOWN, N. Y.—Factory of the Chevrolet Motor Co. here recently sustained damage by fire.

BATAVIA, N. Y.—City council has approved plans for a 1,500,000-gallon water storage tank to cost $96,000. Bids for construction will be sought at once.

BUFFALO—Pennsylvania railroad is having plans drawn for a $1,500,000 coal trestle to be erected in the Hamburg turnpike adjacent to its watefront yards and will use the structure when completed for loading lake coal from many points on its line.

Ohio

CINCINNATI — Gulf Refining Co., Pittsburgh, plans installation of motors and controls, electric pumping machinery, etc., in new bulk oil storage and distribution plant here to cost about $100,000.

CLYDE, O.—Davidson Enamel Co. is making alterations to its plant here, and will be in production about Nov. 15. R. R. Trubey is manager.

CLEVELAND—Myer Dairy Products Co., 6400 Waterman avenue, has awarded contract to Albert M. Higley Co. for construction of a service building, to cost $10,000.

CLEVELAND — Truck Engineering Co., 1801 East Thirty-seventh street, has awarded contract to Albert M. Higley Co., for erection of 1-story brick building, to cost $8000.

Michigan

DETROIT—Findley Tool & Die Co., 5860 Twelfth street, is planning to erect a factory building on Williams street, to cost $10,000.

DETROIT—Wayne Equipment Co., 1629 Penobscot building, has been incorporated to deal in machines, by Melville C. Mason, 2900 Union Guardian building.

DETROIT—National Automotive Fibres Co., 4-236 General Motors building, has awarded contract to O. W. Burke Co. for a warehouse building, 2 stories, 80 x 160 feet, to be erected on Hoover avenue. Approximate cost $50,000.

JACKSON, MICH.—Index Machine & Tool Co., 543 North Mechanic, has been incorporated to deal in tools, by Emil G. Calbert, 307 Quarry street.

MT. CLEMENS, MICH.—City will make application for federal loan for construction of $450,000 sewage disposal plant and trunk line sewer intercepter. C. P. McGrath, Mt. Clemens, engineer, will draft the proposed plans.

Indiana

HAMMOND, IND.—Keen Foundry Co. has filed papers with the Indiana secretary of state showing the reorganization of the company with capital stock of 1000 shares. Louis E. Keen, 47 Waltham street, Hammond, Ind., is resident agent.

MUNCIE, IND.—Durham Mfg. Co. has acquired the Acme Machine Products Co., Muncie, and is installing new machinery for the manufacture of chromium-plated tubular furniture. R. V. Stoner is general manager.

MUNCIE, IND.—Increased activity at the plant of the Warner Gear Co. has resulted in a step-up in employment of more than 40 per cent above the July figures, according to John M. Simpson, vice president and general manager. A further increase is expected.

Illinois

CHICAGO—Dearborn Paper Co., 860 Rees street, plans installing motors and controls, conveyors, etc., in new paper converting plant, to cost approximately $85,000.

CHICAGO — Great Lakes Spring Corp., 6401 West Sixty-fifth street, has been incorporated by Thomas Maroney, Harry Fante and Lesire Yan More, to deal in and manufacture cushion and other springs, wire products and stampings. Correspondent: George M. Sundheim, 36 South Dearborn street.

CHICAGO—Roofing Machinery Mfg. Co., 1250 Central Park avenue, has been incorporated to manufacture machinery, tools and machinery equipment and appliances, by E. S. Guyton, C. Ernest Guyton and D. G. MacFarland. Correspondent: Heth & Lister, 1 North LaSalle street.

CHICAGO—Wonda Air Corp., 160 North LaSalle street, has been incorporated by Jacob J. Blum, Frank Pearlman and Joseph H. Miller, to manufacture heating, ventilating and air conditioning equipment. Correspondent: H. Kay George, 160 North LaSalle street.

CHICAGO—Griffin Wheel Co., 445 North Sacramento boulevard, is erecting a new building to house its molding floor, the old structure being razed. The plant is being changed from hand to mechanical molding. Molding machines have been bought to provide an output of 450 wheel molds daily.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids Nov. 2, schedule 3574, motor generators, controllers and spare parts; Nov. 6, schedule 3601, 200 primer pumps, delivery Philadelphia; schedule 3609, motor-driven crank shapers, delivery Brooklyn, N. Y., and Philadelphia; Nov. 9, schedule 3628, steel forgings for turbine rotors, delivery Brooklyn, N. Y., and Philadelphia; Nov. 13, schedule 3644, two motor-driven engine lathes and spare parts, delivery Puget Sound, Wash.

WASHINGTON — Treasury department, procurement division, public works branch, will receive bids Nov. 13 for engine-generator set for national home for lepers, Carville, La.

Florida

JACKSONVILLE, FLA. — Taylor Engineering Co., Jacksonville, has completed preliminary report on electric light plant and has recommended expenditure of $430,000 for improvements.

JACKSONVILLE, FLA.—Chandler Spring Service Inc. has been organized to deal in machinery, by D. F. Chandler, 2740 Market street, and C. H. Bartlett.

PORT ST. JOE, FLA.—Alfred I. duPont, Barnett National Bank building, is negotiating with various interests in paper industry with view to building paper mill here.

WEST PALM BEACH, FLA.—Coxwell-Southard Canning Co. Inc., Box 117, F. S. Coxwell, secretary, is planning to install steam boiler, engine and equipment.

Georgia

ELBERTON, GA.—American Granite Quarries Inc., Atlanta, Ga., plans installing motors and controls, conveyors, electric cranes and other equipment in new fabricating and finishing plant at Elberton. Cost over $75,000.

SAVANNAH, GA.—Walter L. Mingledorff, vice president, Savannah Machine & Foundry Co., has acquired marine railway of Kehoe Iron Works and will operate it as Marine Railway Co. Inc.; plans repairs and alterations for landing 1200-ton ships.

Kentucky

WINGO, KY.—City has PWA loan of $36,000 for construction of waterworks system.

COVINGTON, KY.—Golden Hill Distilling Co. has been incorporated with $125,000 capital, by Arthur L. Bayer and Sol A. Finesilver.

Maryland

SYKESVILLE, MD.—State of Maryland has been granted federal loan of $61,500 for dormitory, alterations, installation of generator and power house equipment at Springfield state hospital, Sykesville, Md.

BLUE MOUNTAIN, MD.—Baker Co., 114 North George street, York, Pa., probably will receive sub-bids Jan. 1 for stone crushing plant to be erected here. Widdicombe Engineering Co., 1700 Sansom street, is engineer.

BALTIMORE—Crab Orchard Distillery Co., Russell & Alluvion streets, has been incorporated by E. Baker Rodman, 2420 Boulevard Napoleon, and J. Reedy Brown, both of Louisville, Ky.

OXFORD, MD.—Oxford Shipyards Inc., J. Ramsey Speer Jr., secretary, is planning to establish plant 66 x 70 feet, for construction of work boats, yachts, etc.

CHESTERTOWN, MD.—Town has been granted PWA loan of $44,000 for sewage disposal plant on Chester river. Charles N. Satterfield, mayor.

North Carolina

RALEIGH, N. C.—City will make application to local government commission for permission to issue $382,000 bonds for construction of sewage disposal system.

SYLVA, N. C.—Jackson Farmers federation, affiliated with the Farmers Federation of Asheville, N. C., plans erecting a cannery in Jackson, N. C.

Tennessee

ALLGOOD, TENN.—Town, W. R. Brewer, recorder, will expend $35,000 for storage reservoir, pumps and a 100,000-gallon tank. Date of opening bids has not been set. J. A. Switzer, Knoxville, Tenn., engineer.

West Virginia

BELLE, W. VA.—E. I. DuPont de Nemours Co., Wilmington, Del., has awarded contract to Koppers Construction Co., Pittsburgh, for a thylox pro-

cess liquid purification plant to be built here. This plant will have a capacity to purify 45,000,000 cubic feet of gas per day.

WHEELING, W. VA.—Hazel-Atlas Glass Co. has rejected bids for addition and alterations to manufacturing plant at Nineteenth and Jacob streets. New bids will be taken early in 1935. Frederic Faris, 1117 Chapline street, Wheeling, W. Va., is architect.

Missouri

MARSHALL, MO.—City plans extensions and improvements to city-owned electric light and power plant, with installation of new generator unit and accessory equipment. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is consulting engineer.

ST. LOUIS—Missouri Press Brick & Improvement Co. has acquired tract of land bounded by Mississippi river, and Kosciusko, Osage, and President streets, where it may build a plant.

ST. LOUIS—Johnston Tin Foil & Metal Co., 6108 South Broadway, is considering erection of 1-story factory. O'Meara & Hills & G. E. Quick, architects, 5709 Waterman building.

ST. LOUIS—Oliver Mfg. Co. Inc., 406 Market street, has been chartered to manufacture and distribute machinery for agricultural and chemical purposes. O. W. Steele is president.

Arkansas

HARDY, ARK.—Town has allotment of $33,000 for waterworks system.

Oklahoma

LAWTON, OKLA.—Alter-Arc Welding Co. Inc. has been organized to operate a welding shop, by M. S. Trent and T. W. Oliver.

TULSA, OKLA.—Central Steel Co. has been incorporated by W. M. Mount, 1648 Swan drive.

TULSA, OKLA.—Franks Mfg. Co. has been incorporated with $25,000 capital to manufacture oil field supplies, by H. H. Franks, president and shop superintendent.

Texas

DAWSON, TEX.—City voted $42,000 bonds for waterworks extensions, including new pumps. Plans will be complete about Dec. 1. W. P. Johnson, mayor.

FORT SAM HOUSTON, TEX.—PWA has allotted $1,933,460 for replacement of buildings, including heating plant, and utilities shop.

ODEM, TEX.—City E. S. Butler, mayor, has plans in progress for waterworks, including distributing system, fire hydrants, meters, 50,000-gallon elevated tank, and well and pump. David M. Duller, engineer, 1618 Second National Bank building, Houston, Tex.

TERRELL, TEX.—City, L. A. Markham, city manager, will vote on bonds for installing sanitary sewer system and disposal plant. Loan and grant of $299,000 has been approved. Bids will be called early in 1935. Powell & Powell, Republic Bank building, Dallas, Tex., engineers.

Wisconsin

MANITOWOC, WIS.—Rahr Malting Co. is building a grain elevator addition, and new equipment to be installed will include conveyors, belts and grain sorting machinery.

MILWAUKEE—George M. Pendergast & Co., foundry supplies, sand, etc., 226 South First street, has incorporated under the same name with capital of $40,000. George M. Pendergast is president and general manager.

MILWAUKEE — General Foundries Co., 1555 South Barclay street, has built an addition to its plant and added a large air compressor which permits the firm to sand blast and more thoroughly clean its castings. Production will start about Dec. 1 on a new hot water heater developed by the company. Gray iron, alloy iron and aluminum castings are produced by the firm. D. A. Lucas is general manager.

PLATTEVILLE, WIS.—City water commission has accepted bid of Worthington Pump & Machinery Corp., Harrison, N. J., to furnish a diesel engine and generator and a deep well pumping unit, at $33,000.

SHEBOYGAN, WIS.—American Molded Products Co., maker of molded products from chemical composition, is moving its plant and offices to this city, where it has purchased the former Blocki Mfg. Co. building, containing 18,000 square feet. W. S. Field is president and general manager.

SOUTH MILWAUKEE, WIS.—Line Material Co. has purchased the transformer division of the Duncan Electric Mfg. Co., Lafayette, Ind., and is making alterations to its South Milwaukee plant to manufacture this new unit.

Minnesota

MINNEAPOLIS—Tropic-Aire Inc., 60 Eleventh avenue, Northeast, manufacturer of automobile heaters, previously operating only an assembling plant, has spent more than $85,000 in adding stamping, chromium and core departments, machine shop and other factory divisions. The company has also started production of a junior arc welder and motor robot which starts and stops the motor so that at all times, whether left in a cold garage or at a street curb, the engine of the automobile is kept warm for instant starting.

Iowa

CLARION, IOWA—W. G. Millen, Iowa Falls, Iowa, will soon open a machinery shop here.

OGDEN, IOWA—Northern Natural Gas Co. will soon start construction of two gas plant buildings, one to house an electrical generating plant and water plant and the other to house two 800-horsepower engines to be used with compressors.

WATELOO, IOWA—John Deere Tractor Co., manufacturer of agricultural machinery, has awarded contract for construction of a factory addition, 180 x 360 feet, total cost to be about $75,000.

Kansas

KANSAS CITY, KANS.—City plans installing motors and controls, electric hoists, conveyors, elevators and other equipment in new city-owned dock and grain elevator on Missouri river levee, at a cost of about $2,000,000. Horner & Wyatt, Board of Trade building, Kansas City, Mo., consulting engineers.

Nebraska

SUTHERLAND, NEBR.—Platte Valley Public Power & Irrigation District, D. D. Price, chief engineer, will receive bids until Nov. 1 for several radial gates, seven skimmer weir gates, four roller bearing gates, guides and operating machinery to be delivered at various points on $7,500,000 irrigation and power project. Complete project includes diversion dam, reservoirs, hydroelectric plant and about 45 miles of canals. Parsons, Klapp, Brinkerhoff & Douglas, 142 Maiden Lane, New York, are consulting engineers.

Colorado

BOULDER, COLO. — Tungsten Production Co. Inc., J. G. Clark, president, is shipping machinery to be installed in either the Dragoon or Hauchuca mountains, Douglas, Ariz., district, for recovery of tungsten from high grade ore.

Nevada

RENO, NEV.—Amador Mother Lode Mining Co., care O. E. Chaney, Reno, president, recently organized, plans installation of motors and controls, electric hoists, loaders, conveyors, etc., for development and operation of gold-mining properties.

Utah

BOUNTIFUL, UTAH—City has arranged for $156,000 bond issue for new city-owned electric light and power plant, using diesel engine-generating units, and for purchase of existing electrical distribution system of Bountiful Light & Power Co. Proposed work will begin soon.

Pacific Coast

ESCONDIDO, CALIF. — Escondido Orange association plans installation of motors and controls, conveyors, loaders and other equipment in new citrus fruit packing and distribution plant, to cost about $130,000. W. W. Ache, 1616 Fourth avenue, Los Angeles, architect.

STOCKTON, CALIF.—James Allen, Stockton, has been awarded contract for building the $175,000 plant of the Morning Milk Co., Wellsville, Utah.

PORTLAND, OREG.—Oceanic Terminal, on the north shore waterfront, recently sustained damage by fire. The dock machine shop also was damaged.

ROWLAND, OREG.—Planing mill of the Purdy Lumber Co. recently was damaged by fire.

COULEE DAM, WASH.—Standard Oil Co. is making ready the site on which it will erect a distributing plant to cost approximately $23,000.

PUGET SOUND, WASH.—Plans for development of the Puget Sound navy yard under a $11,000,000 public works program includes a 1200-foot pier, smith and pipe shop, plating shop, supply pier, hangar and runway, and addition to the foundry.

SEATTLE—Simmons Co. has established a branch manufacturing plant at First and Spokane streets. Machinery is now being installed. J. F. Wrightson, district sales manager, has been transferred from Portland to supervise operations here.

TACOMA, WASH.—Clear Fire Lumber Co. sawmill recently was damaged by fire.